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**NASA TECHNICAL
MEMORANDUM**

Report No. 53956

**CASE FILE
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CAPE KENNEDY WIND COMPONENT STATISTICS
MONTHLY AND ANNUAL REFERENCE PERIODS
FOR ALL FLIGHT AZIMUTHS FROM 0
TO 70 KM ALTITUDE

By S. C. Brown
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16. ABSTRACT Head-, tail-, and cross-wind component speeds for Cape Kennedy are tabulated for all flight azimuths for altitudes from 0 to 70 km by monthly and annual reference periods. Wind speeds are given for 11 selected percentiles ranging from 0.135 percent to 99.865 percent for each reference period.					
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LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1.1-1.13	Scalar Wind.....	5-17
2.1-2.13	Head and Tail Wind Components - 30 Degree Flight Azimuth.....	18-30
3.1-3.13	Right and Left Cross Wind Components - 30 Degree Flight Azimuth.....	31-43
4.1-4.13	Head and Tail Wind Components - 45 Degree Flight Azimuth.....	44-56
5.1-5.13	Right and Left Cross Wind Components - 45 Degree Flight Azimuth.....	57-69
6.1-6.13	Head and Tail Wind Components - 60 Degree Flight Azimuth.....	70-82
7.1-7.13	Right and Left Cross Wind Components - 60 Degree Flight Azimuth.....	83-95
8.1-8.13	Head and Tail Wind Components - 75 Degree Flight Azimuth.....	96-108
9.1-9.13	Right and Left Cross Wind Components - 75 Degree Flight Azimuth.....	109-121
10.1-10.13	Head and Tail Wind Components - 90 Degree Flight Azimuth.....	122-124
11.1-11.13	Right and Left Cross Wind Components - 90 Degree Flight Azimuth.....	135-147
12.1-12.13	Head and Tail Wind Components - 105 Degree Flight Azimuth.....	148-160
13.1-13.13	Right and Left Cross Wind Components - 105 Degree Flight Azimuth.....	161-173

TECHNICAL MEMORANDUM X-53956

CAPE KENNEDY WIND COMPONENT STATISTICS MONTHLY AND ANNUAL REFERENCE PERIODS FOR ALL FLIGHT AZIMUTHS FROM 0 TO 70 KM ALTITUDE

SUMMARY

Head-, tail-, and cross-wind component speeds for Cape Kennedy are tabulated for all flight azimuths for altitudes from 0 to 70 km by monthly and annual reference periods. Wind speeds are given for 7 selected percentiles ranging from 0.135 percent to 99.865 percent for each reference period.

INTRODUCTION

In presenting a consolidated tabulation of wind statistics for all flight azimuths, this report serves as a standard reference for a number of aerospace engineering applications; e.g., wind-biased control programs and trajectory dispersion analyses.

This document supersedes MSFC Memorandum R-AERO-Y-118-66, entitled "Cape Kennedy Wind Component Statistics, 0 to 60 Km Altitude, for all Flight Azimuths for Monthly and Annual Reference Periods."

EXPLANATION

Since wind statistics vary only slightly with small azimuth changes, the azimuth increment given here (15 degrees) is considered sufficiently small to effectively describe all azimuths. Figure 1 shows the range of azimuths over which the published wind speeds apply without interpolation. Since the wind components are orthogonal to the flight azimuth, it becomes obvious that wind statistics for all other azimuths can be obtained from the tables as illustrated in the following tabulation.

USE OF PUBLISHED STATISTICS TO OBTAIN OTHER
FLIGHT AZIMUTHS (α = flight azimuth)

To Obtain	Headwind	Tailwind	Left Crosswind	Right Crosswind
$\alpha = 15^\circ$	Use $\alpha = 105^\circ$ Left Crosswind (-)	Use $\alpha = 105^\circ$ Right Crosswind (+)	Use $\alpha = 105^\circ$ Tailwind (+)	Use $\alpha = 105^\circ$ Headwind (-)
$\alpha = 360^\circ$	Use $\alpha = 90^\circ$ Left Crosswind (-)	Use $\alpha = 90^\circ$ Right Crosswind (+)	Use $\alpha = 90^\circ$ Tailwind (+)	Use $\alpha = 90^\circ$ Headwind (-)
$\alpha = 120^\circ$	Use $\alpha = 30^\circ$ Right Crosswind (+)	Use $\alpha = 30^\circ$ Left Crosswind (-)	Use $\alpha = 30^\circ$ Headwind (-)	Use $\alpha = 30^\circ$ Tailwind (+)
$\alpha = 135^\circ$	Use $\alpha = 45^\circ$ Right Crosswind (+)	Use $\alpha = 45^\circ$ Left Crosswind (-)	Use $\alpha = 45^\circ$ Headwind (-)	Use $\alpha = 45^\circ$ Tailwind (+)
$\alpha = 150^\circ$	Use $\alpha = 60^\circ$ Right Crosswind (+)	Use $\alpha = 60^\circ$ Left Crosswind (-)	Use $\alpha = 60^\circ$ Headwind (-)	Use $\alpha = 60^\circ$ Tailwind (+)
$\alpha = 165^\circ$	Use $\alpha = 75^\circ$ Right Crosswind (+)	Use $\alpha = 75^\circ$ Left Crosswind (-)	Use $\alpha = 75^\circ$ Headwind (-)	Use $\alpha = 75^\circ$ Tailwind (+)
$\alpha = 180^\circ$	Use $\alpha = 90^\circ$ Right Crosswind (+)	Use $\alpha = 90^\circ$ Left Crosswind (-)	Use $\alpha = 90^\circ$ Headwind (-)	Use $\alpha = 90^\circ$ Tailwind (+)
$\alpha = 195^\circ$	Use $\alpha = 105^\circ$ Right Crosswind (+)	Use $\alpha = 105^\circ$ Left Crosswind (-)	Use $\alpha = 105^\circ$ Headwind (-)	Use $\alpha = 105^\circ$ Tailwind (+)

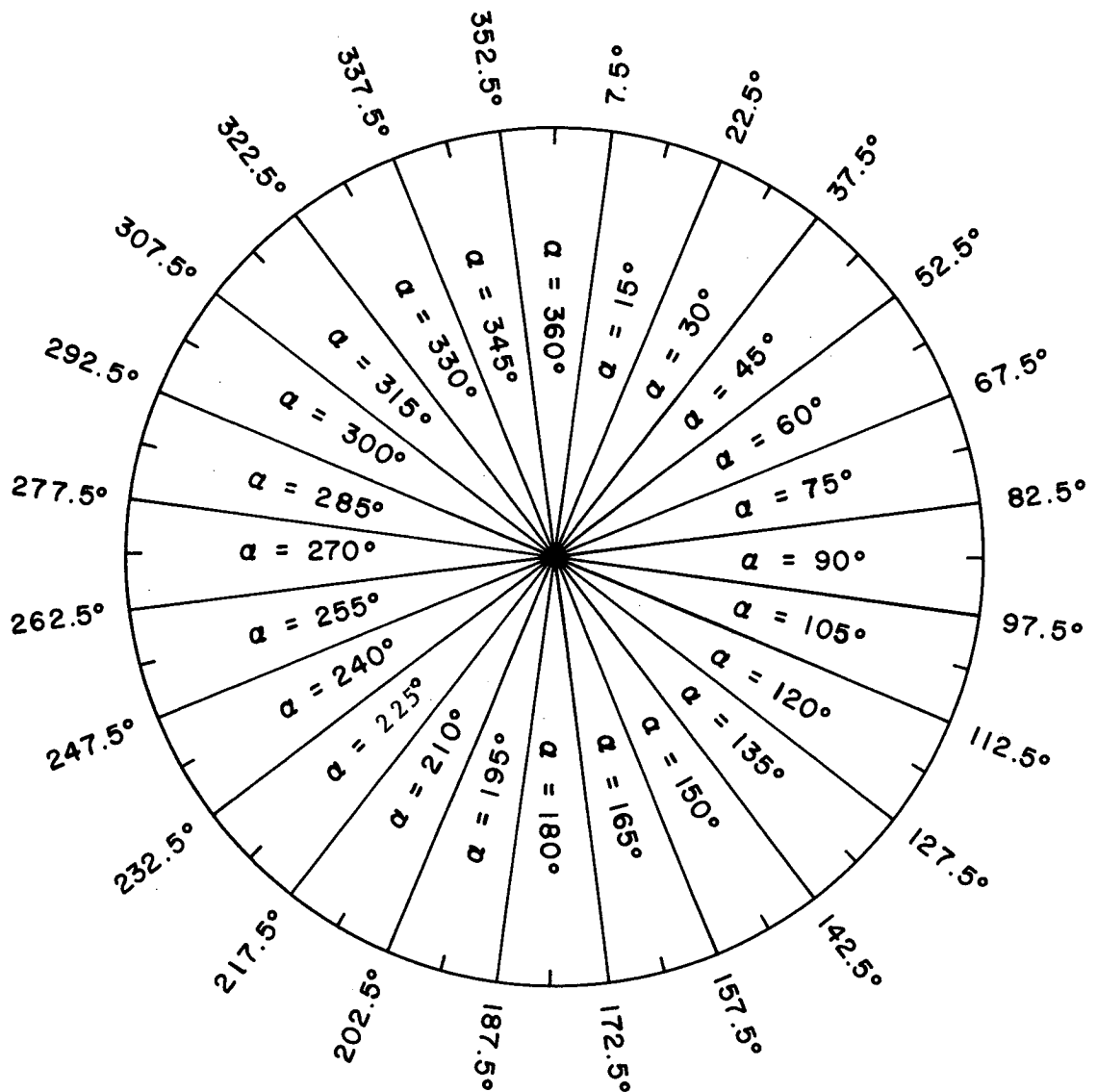


Figure 1. Range of Azimuths for Which The
Published Values Should be Used Without Interpolation

(NOTE: If the desired flight azimuth falls on a line of separation, choose the α towards the E-W axis. Direction azimuths are with reference to true north.)

The wind components at the several percentiles apply to the listed azimuth plane and its orthogonal plane. Consider, for example, the 30-degree flight azimuth tabulation. Under head- and tail-winds, the negative (headwind) values indicate a wind component blowing from 30 degrees. The positive values (tail-wind) indicate a wind component blowing from 210 degrees. Under right and left cross-winds, the negative values (left cross-wind) show the wind component from 300 degrees while the positive values (right cross-wind) give the component from 120 degrees. All wind speeds are in meters per second.

The tables were produced by first forming a cumulative percentage frequency of component wind speeds for each flight azimuth. Wind speed values were then interpolated for the listed percentage levels from the cumulative percentage frequency. Where no entry appears under a listed percentage level, the first value of the cumulative percentage frequency was larger than that called for percentage level. Since this depended upon the number of observations and the frequency of occurrence of the minimum wind speed, .135 percent values could be obtained only for 31-day months with single minimum wind speed occurrences and for annual reference periods. The small number of observations above 27 km caused several other percentage levels to be unavailable also. At all altitudes the minimum wind speed should be substituted for all missing percentiles.

Two data samples were used to compute the wind component statistics. The lower level (0 to 27 km) sample was composed of 12 years of serially complete radiosonde observations taken twice daily. The upper altitude (28 to 70 km) sample, although smaller and not serially complete, contained all rocketsonde observations available at this time.

To relate the tabulated percentage levels to the normal (Gaussian) distribution use:

<u>Normal Distribution</u>	<u>Percentile</u>
mean -3 standard deviations	0.135
mean -2 standard deviations	2.28
mean -1 standard deviation	15.9
mean median	50,000
mean +1 standard deviation	84.1
mean +2 standard deviations	97.72
mean + 3 standard deviations	99.865

SCALAR WIND

TABLE 1.1

DATA SOURCE										JANUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM 88S	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 744	*0.0						*0.2	+1.5	+3.3	+5.8	+7.9	+8.8	+10.0	+11.4	+12.0	
1.0 744	*0.0				*0.4	*1.0	*1.6	+3.5	+7.6	+12.8	+17.4	+20.2	+21.9	+26.9	+28.0	207
2.0 744	*0.0				*0.6	+1.5	+2.3	+4.1	+8.9	+16.3	+21.8	+25.2	+27.5	+30.9	+34.0	240
3.0 744	*0.0			*0.0	*1.2	+2.2	+3.2	+5.9	+12.0	+20.2	+27.1	+29.3	+33.2	+36.9	+41.0	225
4.0 744	*0.0				*1.8	+2.6	+4.3	+8.2	+14.7	+24.8	+31.3	+34.5	+38.5	+42.9	+46.0	250
5.0 744	*1.0 53	*1.0			*2.4	+3.9	+6.3	+11.1	+18.7	+29.2	+36.8	+41.7	+48.1	+51.0	+57.0	234
6.0 744	*2.0 20	*2.0			*3.8	+6.1	+8.5	+13.5	+23.1	+33.8	+41.9	+45.4	+50.6	+53.9	+57.0	270
7.0 744	*4.0 315	*4.0			*5.0	+7.3	+10.6	+15.8	+26.6	+39.2	+46.9	+52.5	+58.5	+62.9	+64.0	260
8.0 744	*2.0 322	*4.0			*7.0	+8.9	+12.3	+18.7	+30.5	+43.6	+53.2	+58.5	+63.5	+73.9	+77.0	260
9.0 744	*3.0 298	*3.0			*7.6	+10.2	+13.9	+21.4	+33.7	+48.5	+59.4	+65.0	+70.5	+74.9	+83.0	260
10.0 744	*4.0 298	*6.0			*7.8	+11.9	+15.9	+24.0	+38.0	+52.8	+65.1	+72.0	+75.5	+82.9	+86.0	275
11.0 744	*5.0 295	*5.0			*9.3	+13.7	+18.1	+26.4	+41.5	+57.9	+70.8	+76.3	+80.7	+86.9	+101.0	240
12.0 744	*5.0 283	*7.0			+11.8	+14.9	+20.2	+30.0	+43.8	+59.1	+70.3	+76.7	+82.5	+87.4	+88.0	
13.0 744	*10.0 284	*10.0			+15.7	+19.1	+21.4	+31.5	+43.1	+57.4	+67.0	+74.8	+79.7	+87.9	+89.0	285
14.0 744	*9.0 297	*9.0			+15.8	+19.7	+20.1	+30.9	+40.4	+50.8	+60.1	+70.8	+72.8	+81.9	+80.0	264
15.0 744	*11.0 290	*12.0			+16.6	+18.4	+21.1	+27.2	+36.4	+47.2	+56.7	+62.7	+70.1	+77.0	+80.0	250
16.0 744	*9.0 276	*10.0			+13.7	+15.5	+18.1	+22.6	+31.4	+40.9	+47.7	+53.0	+56.5	+62.9	+69.0	250
17.0 744	*9.0 213	*9.0			+10.3	+11.9	+13.4	+18.0	+25.0	+34.2	+39.9	+44.5	+47.8	+55.9	+58.0	250
18.0 744	*0.0	*0.0			*4.3	+6.9	+9.0	+12.1	+18.5	+26.1	+33.4	+38.3	+41.5	+45.9	+47.0	254
19.0 744	*0.0	*0.0			*1.9	+2.6	+4.1	+6.8	+12.5	+19.3	+27.3	+32.6	+36.5	+50.4	+51.0	
20.0 744	*0.0	*0.0			*0.5	+1.2	+2.1	+4.1	+8.3	+14.7	+21.1	+24.8	+28.1	+41.4	+42.0	
21.0 744	*0.0	*0.0			*0.7	+1.3	+2.7	+4.5	+12.8	+19.8	+24.4	+24.4	+29.3	+37.9	+39.0	265
22.0 744	*0.0	*0.0			*0.0	+0.6	+1.2	+2.8	+6.0	+12.1	+18.3	+22.6	+29.3	+36.9	+39.0	265
23.0 744	*0.0	*0.0			*0.1	+0.5	+1.2	+2.7	+6.3	+11.8	+19.3	+24.3	+29.5	+37.9	+39.0	265
24.0 744	*0.0	*0.0			*0.3	+1.0	+1.5	+3.3	+7.1	+12.9	+19.7	+25.0	+28.7	+36.9	+42.0	260
25.0 744	*0.0	*0.0			*1.0	+1.4	+2.1	+3.7	+7.9	+15.2	+21.4	+25.4	+30.3	+38.9	+41.0	270
26.0 744	*1.0	*1.0			+1.3	+2.2	+4.3	+9.2	+19.1	+26.3	+31.5	+35.5	+49.9	+51.0	+60.0	244
27.0 744	*1.0	*1.0			+1.1	+1.5	+2.4	+4.8	+10.6	+21.9	+29.6	+35.3	+49.2	+56.9	+53.0	263
28.0 106	1.4 175				1.4	2.9	3.4	7.8	12.4	21.1	26.4	30.1	36.7	36.4	36.4	264
29.0 107	2.3 104				3.0	3.5	4.1	7.0	14.0	25.0	29.0	34.4	37.0	34.4	34.5	269
30.0 104	4.3 204				5.0	5.7	7.1	9.4	18.0	29.3	38.2	36.5	37.0	41.4	41.5	255
31.0 109	3.6 219				4.1	6.2	7.5	11.4	20.4	32.2	38.3	40.5	42.3	45.0	45.0	270
32.0 115	3.6 244				4.1	6.2	7.7	10.6	22.2	35.5	40.4	43.7	44.0	47.0	48.0	268
33.0 115	4.3 134				4.4	4.8	7.9	14.1	25.0	38.1	42.4	45.7	47.5	48.1	48.2	92
34.0 117	4.1 164				4.2	5.3	6.6	12.3	25.0	39.6	40.1	50.3	52.4	55.0	55.2	97
35.0 116	2.0 270				2.2	4.2	5.1	9.0	28.4	41.1	52.1	55.0	61.4	64.5	65.6	97
36.0 116	1.8 154				2.2	3.3	4.0	10.5	29.4	41.8	52.7	61.4	65.4	68.4	68.7	95
37.0 114	1.4 156				1.5	2.4	5.4	10.1	31.1	41.0	54.2	61.0	65.4	75.7	75.3	90
38.0 115	1.1 115				2.1	2.8	5.4	10.1	30.7	41.0	56.3	65.4	67.0	82.1	82.4	97
39.0 117	0.0 0				0.2	1.7	3.0	12.1	30.7	41.0	56.3	65.4	67.0	82.1	82.4	97
40.0 115	3.7 147						4.6	10.1	31.4	42.4	53.6	65.7	71.0	76.7	76.3	103
41.0 117	4.3 323						5.3	9.4	32.5	45.4	56.2	63.3	65.0	89.1	89.1	104
42.0 114	2.2 153				2.3		4.9	10.1	31.0	46.0	56.4	66.0	68.0	95.4	95.7	105
43.0 113	3.5 270				3.4	4.3	12.0	30.5	46.0	62.7	65.0	66.0	94.2	94.4	94.4	104
44.0 113	3.1 270				4.4	6.7	13.0	20.3	44.4	61.4	69.4	71.0	94.0	95.0	95.0	98
45.0 111	3.7 175				4.3	8.2	12.5	20.4	49.4	62.5	69.4	73.0	90.1	90.2	90.2	93
46.0 110	6.5 194				7.1		14.4	31.0	50.4	61.5	68.5	76.0	91.0	91.2	91.2	96
47.0 106	5.2 134				7.1		10.2	15.5	32.0	50.5	64.0	71.4	77.0	84.4	84.9	97
48.0 104	1.1 174						7.4	9.4	14.5	34.3	51.5	63.0	71.4	80.0	80.5	94
49.0 100	4.6 1						5.3	9.0	14.4	36.3	50.7	62.0	70.7	74.0	80.0	97
50.0 100	5.1 51				5.0		6.3	7.7	16.3	37.0	53.1	63.0	71.7	76.0	80.1	222
51.0 96	5.5 13				8.1		9.4	14.7	36.2	55.0	67.3	70.0	76.5	76.0	75.0	219
52.0 84	2.7 45				6.0		7.7	14.0	36.7	58.0	69.4	72.0	77.1	77.4	77.0	291
53.0 83	2.5 19				6.0		9.1	11.7	41.5	59.5	71.0	74.1	77.2	74.1	74.2	262
54.0 72	4.3 302				7.3		8.6	14.4	44.0	63.4	76.2	74.0	79.4	80.3	80.4	263
55.0 60	5.9 124				8.5		10.2	15.2	41.5	61.9	74.4	84.4	96.4	96.9	97.0	270
56.0 57	4.4 165				8.3		12.0	14.0	44.5	71.0	81.0	91.7	92.4	93.3	93.4	273
57.0 46	3.8 224				8.0		12.3	23.3	47.0	71.0	81.0	91.7	92.4	93.3	93.4	273
58.0 26	8.1 264						11.3	14.1	51.0	77.9	100.7	140.0	140.4	140.4	140.4	253
59.0 14	11.0 254							17.2	44.0	80.4	115.1	115.7	116.4	116.5	116.5	275
60.0 10	12.9 255							30.5	46.0	71.4	75.7	76.0	76.2	76.3	75.3	276
61.0 7	15.1 253							20.1	43.5	60.0	75.4	75.5	75.4	75.6	75.5	275
62.0 6	24.5 274								60.0	71.0	71.3	71.5	71.5	71.5	71.5	273
63.0 5	25.4 275								62.3	83.0	83.0	83.3	83.3	83.4	83.4	253
64.0 4	24.8 290								54.0	65.5	67.0	67.1	67.2	67.2	67.2	260
65.0 3	31.0 277								54.4	62.3	62.4	62.4	62.4	62.4	62.4	245
66.0 3	25.8 301								53.5	61.3	61.5	61.5	61.5	61.5	61.5	245
67.0 3	46.5 290								49.5	60.5	60.5	60.5	60.5	60.5	60.5	245
68.0 4	36.6 290								52.0	112.3	112.7	112.0	112.4	112.0	112.0	243
69.0 4	24.8 284								49.0	123.4	123.3	124.0	124.0	124.1	124.1	248
70.0 4	21.6 264								39.0	127.5	124.0	124.1	124.2	124.2	124.2	246

SCALAR WIND

TABLE 1.2

DATA SOURCE							FEBRUARY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	676	0+0					0+0	+0.4	+1.6	+3.7	+8.4	+10.5	+10.5	+12.6	+13.0	
1.0	676	0+0					+0.3	+0.8	+1.7	+3.6	+7.5	+14.2	+18.9	+21.7	+24.7	220
2.0	676	0+0					+1.0	+1.4	+2.3	+4.2	+9.3	+18.0	+24.8	+27.7	+29.8	286
3.0	676	0+0					+1.5	+2.2	+3.2	+5.4	+12.5	+21.8	+29.2	+33.3	+35.4	290
4.0	676	0+0					+1.5	+3.0	+4.7	+7.8	+15.1	+26.1	+33.7	+38.6	+42.2	290
5.0	676	0+0					+2.1	+3.2	+5.6	+10.2	+19.0	+30.3	+39.1	+43.3	+48.2	290
6.0	676	0+0					+2.6	+4.4	+6.9	+12.6	+23.0	+35.9	+43.7	+48.1	+51.2	270
7.0	676	0+0					+4.2	+6.0	+7.9	+14.4	+26.6	+40.4	+51.1	+54.7	+60.2	270
8.0	676	0+0					+5.7	+7.2	+9.4	+17.3	+30.3	+45.5	+56.0	+62.5	+67.6	270
9.0	676	0+0					+6.4	+9.2	+11.9	+19.3	+34.7	+50.7	+63.3	+69.5	+75.1	270
10.0	676	0+0					+7.2	+10.0	+12.6	+20.9	+39.6	+56.0	+68.8	+74.8	+77.7	250
11.0	676	0+0					+6.9	+10.7	+13.9	+23.8	+42.4	+60.4	+74.1	+81.1	+84.0	250
12.0	676	0+0					+9.7	+13.4	+17.5	+27.1	+45.6	+61.9	+75.8	+85.7	+92.1	250
13.0	676	0+0					+13.3	+17.4	+19.3	+28.3	+43.6	+61.0	+74.1	+85.7	+98.0	260
14.0	676	0+0					+15.2	+18.3	+20.6	+27.4	+40.7	+56.1	+64.0	+71.2	+78.2	260
15.0	676	0+0					+12.3	+14.5	+17.6	+24.3	+36.0	+48.7	+57.4	+62.5	+67.1	275
16.0	676	0+0					+11.1	+12.3	+15.0	+20.6	+30.6	+42.3	+49.5	+54.1	+58.0	255
17.0	676	0+0					+5.7	+9.0	+11.1	+16.1	+25.1	+34.3	+42.5	+45.4	+48.2	256
18.0	676	0+0					+2.7	+4.6	+6.7	+11.2	+18.1	+27.1	+33.5	+38.5	+41.8	260
19.0	676	0+0					+1.0	+2.0	+3.5	+5.5	+11.9	+19.8	+28.5	+33.7	+37.0	270
20.0	676	0+0						+1.1	+1.6	+3.1	+5.6	+12.3	+20.6	+27.7	+31.0	250
21.0	676	0+0					+0.0	+0.6	+1.2	+2.4	+5.8	+11.7	+16.9	+19.7	+24.4	236
22.0	676	0+0					+0.3	+1.0	+2.1	+5.0	+11.0	+15.0	+18.8	+25.3	+34.0	270
23.0	676	0+0					+0.1	+0.6	+2.2	+5.1	+10.6	+15.3	+18.4	+20.7	+32.0	96
24.0	676	0+0					+0.3	+1.0	+2.3	+5.4	+10.7	+15.3	+18.5	+21.0	+22.6	23.0
25.0	676	0+0					+0.1	+0.5	+1.1	+2.5	+5.9	+11.4	+16.1	+18.9	+21.6	100
26.0	676	0+0					+0.7	+0.7	+1.3	+2.8	+6.5	+12.6	+17.2	+19.7	+24.6	80
27.0	676	0+0					+0.2	+0.9	+1.5	+3.0	+7.1	+13.5	+19.7	+24.1	+26.1	87
28.0	82	0.3	4				0.4	0.4	2.4	7.4	14.0	20.9	25.4	25.4	25.4	261
29.0	82	1.0	270				2.9	4.4	4.4	14.0	21.0	25.4	25.4	25.4	25.4	260
30.0	81	2.0	270				5.0	7.4	12.0	21.5	27.6	29.9	31.2	32.0	32.0	270
31.0	81	1.7	102				3.9	5.0	12.0	25.4	30.0	33.0	35.1	35.4	35.7	269
32.0	81	1.4	225				3.9	5.0	7.0	20.1	30.0	34.0	38.2	47.1	47.7	260
33.0	84	2.8	45				3.0	4.4	4.7	21.7	32.0	35.0	37.4	50.1	51.1	265
34.0	94	3.7	130				4.2	4.4	21.7	33.3	37.3	39.0	44.1	46.1	46.1	267
35.0	100	2.1	230				3.4	5.7	9.2	20.5	33.1	34.0	34.0	44.0	47.0	275
36.0	102	4.6	120				5.1	5.1	12.0	20.8	33.4	43.5	44.0	44.0	52.3	278
37.0	105	4.2	300				4.2	4.4	11.3	22.4	32.7	43.3	44.4	52.0	57.0	265
38.0	107	4.2	311				5.2	7.5	12.0	23.4	35.1	42.7	50.4	52.0	55.0	267
39.0	109	4.9	272				5.0	6.4	13.4	24.1	36.4	42.4	44.4	51.0	61.4	260
40.0	109	4.5	320				7.5	8.6	13.4	26.4	35.0	44.4	47.4	64.0	67.0	268
41.0	112	7.0	1				7.3	0.6	14.0	26.4	35.0	44.4	47.4	64.0	73.6	244
42.0	109	5.1	02				5.1	6.2	17.4	28.0	39.7	50.4	58.4	65.4	70.4	265
43.0	108	3.1	30				3.2	3.7	0.4	21.1	20.7	42.0	53.4	65.4	70.4	265
44.0	104	4.2	28				5.1	7.4	9.7	17.0	30.0	44.4	60.4	72.4	73.0	282
45.0	104	3.0	348				4.1	5.4	3.3	17.4	32.0	44.1	62.4	73.4	76.4	297
46.0	102	2.0	45				2.1	5.3	10.1	19.4	33.7	50.4	67.0	74.0	81.0	291
47.0	102	1.3	297				1.3	2.3	13.1	19.1	34.7	53.4	68.4	73.0	80.0	298
48.0	94	4.5	207				5.2	10.0	19.0	34.4	50.4	61.4	71.4	76.7	77.0	263
49.0	94	5.5	219				4.2	12.4	29.0	34.1	54.0	72.4	76.0	80.0	80.4	267
50.0	90	5.5	250				12.0	19.2	24.4	37.4	54.4	64.4	73.0	83.0	83.4	262
51.0	83	4.9	311				6.0	14.0	24.4	35.4	54.4	64.4	73.0	83.0	83.4	267
52.0	80	7.2	350					13.0	25.4	39.0	54.0	70.4	75.1	81.2	82.0	265
53.0	74	0.6	27					12.7	22.4	31.4	44.4	62.4	77.4	80.2	80.4	247
54.0	66	11.0	39					17.5	24.2	33.4	40.0	64.4	75.7	80.4	80.4	245
55.0	60	21.5	277					27.0	33.4	52.0	70.4	81.0	84.4	90.4	91.2	248
56.0	50	24.4	269					27.5	31.4	54.0	64.7	90.4	92.0	102.4	103.1	261
57.0	45	26.3	294					24.3	31.4	54.4	60.4	89.4	105.0	121.4	121.4	267
58.0	39	24.0	302					26.0	38.2	54.4	69.4	81.1	105.0	105.0	105.4	240
59.0	27	27.9	309					29.4	35.4	54.4	81.7	105.7	104.0	104.4	104.4	283
60.0	20	25.1	320					25.0	35.4	54.4	81.7	105.7	104.0	104.4	104.4	244
61.0	15	23.1	336					41.1	50.0	84.4	103.0	109.4	109.4	109.4	109.4	244
62.0	7	24.4	356					29.1	72.4	94.4	101.4	101.4	102.0	102.0	102.0	247
63.0	4	30.1	252						97.4	95.0	97.4	97.4	97.4	97.4	97.4	262
64.0	2	89.5	272						99.0	111.4	111.0	112.1	112.1	112.1	112.1	260
65.0	1	75.6	265						94.0	92.0	92.4	92.4	92.4	92.4	92.4	265
66.0	2	57.3	261						57.0	64.0	69.0	69.0	69.0	69.0	69.0	264
67.0	1	117.4	261													261
68.0	1	115.1	274													263
69.0	3	57.8	285													268
70.0	3	43.9	266													244

SCALAR WIND

TABLE 1.3

DATA SOURCE							MARCH									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	144	0.0					0.6	1.6	3.4	6.2	8.2	9.5	10.5	12.9	14.0	340
1.0	744	0.0		0.0	0.7	1.2	1.9	3.7	7.3	12.7	16.9	20.2	22.7	25.9	27.0	220
2.0	744	0.0		0.0	0.4	1.0	2.0	4.0	8.4	15.7	24.2	24.2	27.1	30.9	34.0	240
3.0	744	1.0		0.0	1.1	1.8	2.6	5.2	11.3	20.0	25.6	28.6	32.7	42.9	50.0	240
4.0	744	1.0		0.0	1.1	1.8	2.6	5.2	11.3	20.0	25.6	28.6	32.7	42.9	50.0	240
5.0	744	1.0	10	1.0	3.0	4.1	6.7	7.6	18.3	28.8	35.1	42.0	46.5	50.9	64.0	250
6.0	744	2.0	275	2.0	4.5	6.3	8.0	12.7	22.5	37.6	40.4	44.6	50.8	57.9	67.0	240
7.0	744	1.0	272	1.0	6.4	7.4	9.5	15.9	26.0	37.6	44.1	50.6	58.7	64.9	71.0	230
8.0	744	3.0		2.0	7.7	9.3	11.3	19.3	29.7	41.9	51.6	57.2	63.7	75.9	81.0	230
9.0	744	3.0	163	4.0	9.2	11.6	13.8	21.1	33.8	46.6	58.6	66.0	72.7	84.9	88.0	232
10.0	744	2.0	263	5.0	9.2	11.7	15.5	24.1	38.3	51.7	64.6	72.0	80.7	91.9	110.0	270
11.0	744	0.0		4.0	10.0	13.1	17.5	28.1	41.7	57.7	69.3	77.4	88.2	94.9	103.0	230
12.0	744	8.0	305	8.0	12.6	15.7	21.5	30.4	44.2	59.2	72.1	80.0	87.7	101.9	104.0	230
13.0	744	13.0	279	13.0	16.1	19.2	22.7	31.3	44.3	58.0	66.6	78.0	85.5	93.9	95.0	233
14.0	744	12.0	322	14.0	16.4	19.4	22.9	28.7	40.4	52.7	61.8	69.0	75.2	79.9	86.0	260
15.0	744	12.0		14.0	16.4	17.1	20.4	25.8	35.5	45.5	55.5	60.6	69.1	73.4	74.0	
16.0	744	7.0	253	8.0	11.4	13.4	16.1	21.4	30.6	39.4	46.6	50.8	54.7	67.9	69.0	254
17.0	744	3.0	87	5.0	7.4	9.2	11.8	15.8	24.5	33.3	39.3	42.8	45.8	55.9	57.0	288
18.0	744	2.0	329	2.0	3.4	5.3	6.7	10.3	17.4	25.9	32.5	37.7	41.9	41.9	57.0	270
19.0	744	1.0		1.0	2.0	2.9	5.3	10.5	18.3	25.2	28.5	31.9	35.9	39.0	45.0	250
20.0	744	0.0		0.0	0.2	0.7	1.3	2.9	6.6	12.9	18.6	22.8	27.5	31.9	34.0	240
21.0	744	1.0		0.1	0.5	1.1	2.3	5.2	10.3	14.4	17.3	19.7	24.9	24.0	22.5	
22.0	744	0.0		0.0	0.2	0.8	2.0	4.4	8.6	13.1	17.5	23.5	34.9	34.0	25.0	
23.0	744	0.0		0.0	0.2	1.0	2.2	4.6	8.5	12.9	17.0	20.8	35.9	31.0	10.5	
24.0	744	0.0		0.1	0.3	0.9	2.1	4.7	9.7	15.3	21.5	21.5	34.9	38.0	101	
25.0	744	0.0		0.0	0.3	0.9	2.1	4.7	9.7	15.3	21.5	21.5	34.9	38.0	8.5	
26.0	744	0.0		0.0	0.3	0.9	2.1	4.7	9.7	15.3	21.5	21.5	34.9	38.0	8.5	
27.0	744	0.0		0.0	0.5	1.2	2.6	6.1	11.7	19.6	24.6	32.5	40.9	49.0	85	
28.0	84	0.7	117				2.1	3.4	4.1	15.4	19.5	20.0	24.2	25.0	25.4	252
29.0	94	1.0	186				3.0	4.7	4.0	18.5	21.6	23.0	31.0	31.6	31.7	264
30.0	97	1.6	15				2.1	3.0	4.0	18.5	21.6	23.0	31.0	31.6	31.7	264
31.0	94	1.5	224				2.6	3.5	5.2	11.2	22.5	25.4	29.0	30.3	30.5	266
32.0	101	3.2					3.2	4.0	5.0	12.1	25.2	29.5	32.7	34.0	35.1	263
33.0	104	2.3	117				2.4	3.3	5.2	11.0	24.1	31.0	34.7	36.0	37.0	241
34.0	104	1.4	92				2.1	2.4	5.1	12.7	24.5	34.0	37.7	39.0	41.0	267
35.0	100	2.9	360		1.4		2.1	2.4	5.1	12.7	24.5	34.0	37.7	39.0	41.0	267
36.0	100	2.6	294		3.0		3.5	4.7	7.0	14.5	24.3	35.0	36.0	39.0	40.0	273
37.0	114	2.4	304		2.5		3.4	5.1	4.0	14.0	24.0	35.0	36.0	39.0	40.0	273
38.0	114	4.2	233				5.0	6.6	15.4	25.0	31.0	35.0	36.0	39.0	40.0	273
39.0	114	1.0	47		4.0		4.5	6.6	17.5	27.0	33.0	39.0	43.4	44.0	44.4	242
40.0	114	2.5	102		4.1		4.8	5.9	11.4	18.5	24.5	35.4	41.0	42.4	44.0	267
41.0	114	2.8	166				3.4	7.4	13.1	20.0	30.2	39.2	42.7	44.4	46.4	232
42.0	114	1.2	270		3.2		4.4	4.4	14.4	20.0	29.0	34.7	41.0	47.4	50.5	228
43.0	114	0.9	154		3.1		5.4	7.9	13.0	20.0	29.0	41.1	44.4	50.5	51.1	240
44.0	114	1.4	337		3.1		4.4	4.4	13.0	22.0	34.7	41.1	44.4	50.5	51.1	240
45.0	111	4.2	44		4.3		4.4	7.3	13.0	22.0	34.7	41.1	44.4	50.5	51.1	240
46.0	110	5.0	245		5.1		6.2	8.3	19.4	24.0	34.0	42.0	49.0	52.1	52.1	242
47.0	108	4.5	9		5.1		6.2	7.7	13.4	25.7	34.0	42.0	49.0	52.1	52.1	242
48.0	107	5.6	104				4.7	15.2	27.1	34.0	49.0	50.0	54.0	54.1	64.1	275
49.0	105	5.2	114				5.4	10.3	20.4	29.8	41.4	46.0	54.0	58.0	55.1	265
50.0	102	4.8	131		4.0		7.3	11.1	20.7	32.0	42.2	49.0	53.4	61.0	57.1	259
51.0	97	4.2	160				4.2	10.9	22.1	31.4	43.0	53.1	62.0	66.0	66.9	256
52.0	94	4.9	144				7.1	17.7	23.0	34.0	45.4	54.0	63.0	64.5	65.0	256
53.0	87	6.4	204		4.0		19.1	25.0	34.4	47.1	59.7	64.0	64.0	64.5	65.4	264
54.0	80	7.7	214		4.0		20.0	25.4	35.4	44.2	54.0	62.0	64.0	64.5	65.0	269
55.0	69	4.6	254				16.5	23.6	34.0	44.0	57.0	61.0	64.0	64.5	65.0	269
56.0	60	4.5	251				0.4	16.0	25.6	34.0	44.0	57.0	61.0	64.0	64.5	269
57.0	51	14.2	94		18.1		18.8	28.0	40.4	52.0	62.0	64.0	64.5	64.5	69.0	268
58.0	41	10.7	70				24.1	30.2	44.0	54.5	61.0	71.1	71.7	72.2	72.2	265
59.0	32	10.7	142				16.6	34.0	44.0	56.0	66.4	82.0	82.5	82.6	82.7	262
60.0	22	10.2	245				29.1	37.2	44.0	54.5	70.0	81.7	82.1	82.3	82.4	241
61.0	14	15.2	255					44.2	44.7	50.4	69.4	70.0	70.3	70.5	70.5	247
62.0	10	20.4	197					41.6	47.0	61.4	63.7	64.1	64.4	64.5	64.5	285
63.0	7	14.5	224					35.1	44.5	67.0	73.0	73.0	73.5	73.5	73.5	245
64.0	5	24.7	220						51.5	81.4	82.0	82.0	82.4	82.4	82.4	247
65.0	3	10.9	241						30.5	50.5	50.4	50.0	50.0	50.0	50.0	242
66.0	2	0.6	314						10.0	24.0	29.4	24.4	24.4	24.4	24.4	241
67.0	1	10.1	335													335
68.0	1	4.4	1													1
69.0	1	4.1	104													104
70.0	1	5.5	13													13

SCALAR WIND

TABLE 1.4

DATA SOURCE							APRIL									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	0.0														
1.0	720	0.0			0.2	0.6	0.9	1.8	3.6	5.8	7.6	8.6	9.8	12.0	13.0	210
2.0	720	0.0			0.2	0.7	1.3	3.1	6.5	10.5	16.5	19.3	21.2	24.0	25.0	300
3.0	720	0.0			0.3	1.0	1.6	3.4	7.9	15.6	21.7	25.1	28.4	30.0	29.0	280
4.0	720	1.0					1.8	3.9	10.0	18.9	25.2	29.8	33.4	35.0	36.0	260
5.0	720	1.0				1.1	2.0	4.5	12.2	22.5	29.2	34.7	38.9	40.0	41.0	270
6.0	720	1.0				1.0	2.4	5.8	15.0	25.9	34.1	38.7	40.4	42.0	43.0	270
7.0	720	0.0				1.2	2.0	3.3	7.3	18.8	29.8	39.0	44.9	49.4	50.0	270
8.0	720	0.0				1.4	2.8	4.5	9.1	21.2	33.4	44.5	49.9	54.9	55.0	270
9.0	720	0.0				2.0	4.0	5.5	10.4	24.4	37.6	50.3	59.1	62.9	64.0	260
10.0	720	1.0	358			3.0	4.5	7.1	12.2	27.0	43.8	55.7	60.8	66.8	67.0	270
11.0	720	1.0				4.1	6.0	8.5	13.8	31.2	48.2	60.6	66.3	75.4	76.0	260
12.0	720	2.0				3.4	6.2	8.6	16.0	34.5	53.0	64.8	71.5	74.9	75.0	260
13.0	720	2.0				5.0	6.7	10.0	18.3	36.8	52.9	64.8	70.0	74.4	75.0	285
14.0	720	2.0	290			4.7	7.3	11.0	19.3	33.7	46.7	58.7	63.7	68.9	69.0	272
15.0	720	2.0	260			4.8	6.7	10.8	17.6	28.7	42.1	49.8	58.6	64.5	65.0	289
16.0	720	3.0	303			3.7	5.3	8.1	13.9	23.6	34.6	42.0	45.3	49.4	50.0	289
17.0	720	1.0				2.4	3.6	5.5	10.1	17.5	27.5	34.2	41.7	45.4	45.0	290
18.0	720	0.0				1.0	2.0	3.1	6.3	11.4	19.3	26.0	31.9	42.0	43.0	290
19.0	720	0.0				1.0	1.0	1.5	2.9	6.7	12.7	19.7	24.7	37.0	38.0	238
20.0	720	0.0				0.1	0.5	1.0	2.3	5.0	9.4	14.1	18.2	23.5	24.0	
21.0	720	0.0				0.0	0.3	0.7	2.0	4.6	8.0	11.2	12.6	15.9	22.0	254
22.0	720	0.0				0.0	0.3	1.0	2.1	4.6	8.1	10.5	11.7	12.9	20.0	320
23.0	720	0.0				0.2	0.6	1.1	2.2	4.7	8.2	11.1	12.6	15.2	23.0	298
24.0	720	0.0				0.1	0.4	1.0	2.1	4.8	8.7	11.9	15.4	20.0	21.0	100
25.0	720	1.0							2.1	5.1	9.4	12.5	14.3	16.9	22.0	100
26.0	720	0.0				0.2	0.5	1.1	2.1	5.3	10.1	14.4	16.8	20.4	24.0	90
27.0	720	0.0				0.2	0.7	1.2	2.2	5.5	10.7	14.4	17.6	21.2	25.5	90
28.0	94	1.0	270						2.2	5.0	12.1	16.1	17.0	21.0	21.5	125
29.0	94	0.1	217			0.6	1.4	3.4	6.6	13.4	16.6	18.6	20.0	20.4	20.5	244
30.0	104	1.7	191				2.1	4.0	7.4	14.2	19.0	19.0	20.0	21.1	21.2	270
31.0	107	1.5	207				3.0	4.3	7.0	14.7	19.7	21.4	22.0	25.2	25.4	275
32.0	104	0.0	0			0.6	1.4	4.7	6.6	14.4	19.0	21.4	22.0	25.2	30.1	268
33.0	104	0.0	0			0.0	0.6	1.7	3.6	8.0	10.1	24.4	24.4	26.0	29.0	270
34.0	104	0.0	0			0.0	0.7	1.6	3.8	8.8	10.1	24.4	24.4	26.0	29.0	270
35.0	110	0.0	0			0.0	0.8	1.8	4.1	10.1	18.4	25.5	28.4	30.4	31.0	268
36.0	112	2.0	46			2.1	2.7	4.3	9.3	17.7	24.9	30.9	30.9	34.0	34.1	274
37.0	112	1.0	270			1.5	3.4	5.3	9.2	17.0	24.2	25.7	27.2	30.4	40.1	285
38.0	114	1.0	07			3.2	4.2	6.1	9.0	16.5	23.3	25.7	26.0	30.1	39.4	207
39.0	112	1.1	333			2.3	3.3	5.7	11.0	16.3	20.7	25.5	26.0	31.0	32.0	270
40.0	112	0.9	227			2.1	3.4	5.0	11.5	16.6	23.4	27.5	28.0	35.6	35.7	275
41.0	113	1.1	345			1.1	3.3	4.2	10.4	16.8	23.7	28.0	29.0	34.0	35.1	255
42.0	112	1.2	317			1.3	3.4	4.7	10.3	17.4	23.4	30.7	31.0	37.2	37.4	251
43.0	112	0.5	140			1.1	3.1	3.7	5.3	16.8	27.2	32.7	37.0	41.4	41.9	257
44.0	111	1.5	3			2.5	3.5	5.4	11.6	19.7	24.7	35.6	39.0	43.0	43.2	262
45.0	110	1.5	40			1.5	1.8	3.2	5.3	11.5	20.1	22.5	37.6	41.0	44.2	245
46.0	107	2.2	346			3.0	3.3	3.9	6.3	12.4	20.3	30.7	40.4	51.0	53.7	249
47.0	105	3.1	100				4.9	7.2	13.0	20.4	35.4	43.6	51.0	54.1	54.1	255
48.0	101	2.5	254				4.2	6.5	11.8	21.7	34.0	47.7	50.0	53.5	53.6	251
49.0	104	1.4	45			1.4	3.2	6.3	12.5	21.0	34.0	47.7	50.5	51.0	51.0	257
50.0	100	0.2	11			0.0	1.4	3.2	5.6	12.1	21.4	37.0	48.7	50.2	50.2	257
51.0	100	0.9	25				2.1	3.0	5.1	12.1	22.4	41.0	49.0	49.4	49.4	256
52.0	94	2.0	180				2.3	3.0	5.4	12.8	20.7	41.1	47.0	49.0	49.4	250
53.0	92	1.0	297			1.5	2.5	6.3	13.0	22.2	40.4	44.0	49.0	49.6	49.5	255
54.0	80	0.9	51				2.7	3.4	5.0	14.0	25.3	40.4	49.0	50.2	51.2	250
55.0	75	1.6	16				5.6	7.6	16.8	28.0	45.0	52.6	53.7	52.7	52.4	247
56.0	52	0.0	0			3.2	4.6	7.3	17.0	26.7	40.2	49.0	51.4	52.2	52.3	253
57.0	52	0.0	0				4.2	8.1	19.3	28.7	46.0	56.0	79.4	80.0	80.0	257
58.0	46	1.8	222				6.3	7.0	19.8	26.5	40.3	53.3	53.0	54.3	54.4	244
59.0	34	1.5	146				8.3	10.4	22.1	37.0	41.4	52.5	52.5	52.7	52.7	247
60.0	24	4.2	51						24.5	28.7	48.8	40.7	49.1	49.3	49.3	243
61.0	14	7.5	104						10.3	22.0	40.4	40.4	49.1	49.3	49.3	242
62.0	3	0.9	103							13.0	40.4	40.4	40.7	41.0	41.0	200
63.0	4	16.4	146							3.0	16.4	17.0	17.1	17.1	17.1	25
64.0	4	6.8	117							3.0	23.4	24.0	24.1	24.1	24.1	75
65.0	2	2.8	98							4.0	0.9	10.2	10.3	10.4	10.4	145
66.0	2	3.3	124							17.0	24.4	27.0	27.1	27.1	27.1	40
67.0	2	0.5	46							27.0	31.4	31.5	31.5	31.5	31.5	104
68.0	2	16.7	81							31.0	43.0	44.2	44.3	44.3	44.3	108
69.0	2	26.9	66													
70.0	2	31.4	58													

SCALAR WIND

TABLE 1.5

DATA SOURCE							MAY								
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE PERCENTAGE FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)	
5FC	744	00.0						15.900	30.000	84.100	95.000	97.720	99.000	99.865	
1.0	744	00.0			00.1	00.5	01.1	01.3	03.0	05.2	06.9	08.1	09.1	10.9	9n
2.0	744	00.0			00.1	00.4	01.0	02.1	05.2	09.0	12.9	16.3	17.7	18.6	19.0
3.0	744	00.0			00.1	00.3	00.9	02.1	05.2	09.6	15.3	18.5	20.6	23.9	27.0
4.0	744	00.0			00.1	00.5	01.1	02.5	05.7	10.8	17.9	21.0	24.7	26.7	232
5.0	744	00.0			00.2	00.7	01.3	02.8	06.6	12.8	19.6	23.0	25.6	28.9	28.1
6.0	744	00.0			00.3	01.0	01.7	03.4	07.7	15.1	21.6	25.6	28.7	31.9	21.9
7.0	744	00.0			01.0	01.5	02.2	03.9	09.3	16.8	24.6	28.5	32.8	37.9	22.1
8.0	744	00.0		00.0	00.6	01.2	02.0	04.9	11.3	20.1	27.1	31.0	37.1	41.4	22n
9.0	744	00.0			01.0	01.6	02.8	05.8	13.5	23.4	30.2	34.2	38.7	44.9	224
10.0	744	01.0			01.3	02.1	03.3	06.9	15.3	27.1	36.9	41.6	44.6	50.9	227
11.0	744	00.0		00.0	02.0	03.3	04.9	08.7	18.2	31.1	41.3	44.6	49.5	57.9	230
12.0	744	01.0	240	01.0	02.2	03.7	06.0	10.4	20.5	35.7	44.5	49.8	55.3	67.9	223
13.0	744	02.0			02.2	03.5	05.7	12.0	22.1	36.9	47.1	51.8	55.5	61.9	240
14.0	744	01.0	21	01.0	03.1	03.9	06.6	11.6	21.7	33.2	43.1	47.0	51.5	59.9	231
15.0	744	01.0	65	01.0	02.4	04.2	07.0	10.5	19.2	27.5	33.8	36.8	40.1	42.9	270
16.0	744	02.0			03.3	04.2	05.7	08.5	14.2	21.7	26.4	28.4	30.2	32.9	270
17.0	744	00.0		00.0	01.1	01.9	03.1	05.5	10.2	15.3	19.8	21.8	23.8	25.9	292
18.0	744	00.0			00.2	00.7	01.4	03.2	06.6	10.6	13.9	15.8	17.5	21.9	296
19.0	744	00.0			00.1	00.4	01.0	02.0	04.6	08.0	10.4	11.7	13.5	18.9	304
20.0	744	00.0			00.1	00.4	01.0	02.1	04.4	07.6	09.9	11.5	13.4	18.9	70
21.0	744	00.0			00.1	00.7	01.2	02.3	05.2	08.4	10.7	12.1	13.5	16.9	79
22.0	744	00.0			00.2	00.5	01.1	02.5	06.1	09.8	11.9	13.3	15.5	21.9	129
23.0	744	00.0			00.4	01.0	01.4	02.9	06.5	10.6	13.3	14.6	16.9	19.6	20.0
24.0	744	01.0			01.1	01.6	03.2	07.1	11.4	14.2	15.9	18.1	20.9	24.0	90
25.0	744	00.0		00.0	00.4	00.9	01.5	03.2	07.4	12.1	15.1	16.6	18.8	20.9	80
26.0	744	00.0		00.0	00.4	01.0	01.6	03.1	07.5	12.5	15.9	18.0	20.5	23.9	80
27.0	744	00.0			00.3	00.8	01.5	03.1	07.2	12.7	16.6	19.0	21.5	23.9	86
28.0	103	1.0	270					1.5	5.8	11.9	19.6	20.6	21.0	25.2	45
29.0	105	1.0	182		1.0	1.2	1.7	3.1	7.0	14.4	20.4	21.0	23.0	27.1	95
30.0	105	0.0	0		0.0	1.1	2.1	4.0	7.9	14.4	19.4	21.7	22.0	26.6	97
31.0	107	0.0	0		0.0	0.5	1.5	3.2	6.4	14.1	17.3	19.0	20.0	24.0	92
32.0	110	0.0	0				0.5	3.3	6.0	14.1	15.9	19.6	22.0	25.0	01
33.0	112	0.0	0		0.0	0.3	0.8	3.3	7.7	13.5	17.9	20.6	22.0	25.0	05
34.0	113	0.0	0		0.1	1.1	1.6	3.5	7.8	13.0	18.4	21.2	21.0	33.4	09
35.0	113	0.0	0		0.1	0.8	1.7	3.8	8.8	14.4	20.4	21.8	22.0	24.7	06
36.0	113	0.0	0			0.6	1.9	4.5	8.0	15.7	18.2	20.2	20.0	21.7	09
37.0	114	0.0	0		0.1	1.1	1.6	4.2	8.0	15.0	18.4	20.4	23.0	26.0	52
38.0	112	1.0	134			1.1	1.7	4.4	8.7	15.6	20.1	21.6	22.0	25.9	302
39.0	112	1.2	256			1.3	1.9	4.3	9.7	15.9	21.4	23.9	23.8	24.2	96
40.0	115	1.0	180			1.3	2.6	4.6	11.1	17.4	21.1	24.2	24.0	26.2	101
41.0	116	0.0	0		0.2	2.3	3.3	5.4	12.1	19.1	24.1	25.7	26.4	26.9	00
42.0	116	0.0	0		3.1	3.5	4.3	6.3	12.9	20.5	23.6	25.8	29.4	31.1	97
43.0	113	0.0	0			1.3	3.2	4.2	14.0	22.3	24.1	25.4	27.0	28.8	255
44.0	112	0.0	0		2.1	2.8	3.9	7.3	16.3	23.9	27.2	28.6	29.0	30.6	102
45.0	111	0.0	0		0.1	3.3	4.5	8.3	17.4	24.5	28.0	30.6	31.0	33.7	78
46.0	108	1.0	360			1.5	3.4	4.8	18.0	24.5	30.7	33.6	33.9	35.9	48
47.0	107	2.2	27		3.1	4.0	5.8	8.5	18.2	27.0	30.7	33.6	36.0	41.2	67
48.0	106	1.0	180		2.1	3.1	5.3	10.0	18.6	26.6	31.4	33.6	36.0	41.6	67
49.0	104	3.0	180		4.0	5.4	8.2	12.6	18.8	27.5	33.2	35.0	37.0	42.0	47
50.0	100	5.4	112		5.0	5.6	7.0	12.6	19.4	29.0	35.0	36.0	38.0	42.3	45
51.0	98	2.0	90			4.2	6.3	11.9	21.4	30.5	38.8	37.8	39.0	39.6	43
52.0	95	1.0	180			3.2	5.8	10.0	21.8	31.0	38.3	39.0	41.0	41.4	114
53.0	90	2.0	180			3.0	5.2	12.1	22.0	31.0	39.3	41.0	43.1	44.1	119
54.0	85	5.0	217			5.6	6.6	10.9	20.7	32.3	40.3	41.1	45.2	46.1	71
55.0	74	1.0	232			5.7	6.0	11.4	20.8	29.0	40.7	44.3	45.2	48.6	46
56.0	66	1.8	58				6.2	11.2	20.3	35.4	41.7	46.6	52.3	52.0	59
57.0	57	0.9	311			4.3	5.9	14.0	20.8	36.0	43.6	46.7	53.2	53.5	8
58.0	43	5.1	170				8.2	15.4	27.5	40.1	41.0	40.0	49.3	50.1	78
59.0	33	7.2	75				9.3	11.6	23.5	36.3	39.4	46.1	46.3	46.5	01
60.0	20	7.5	280				9.0	12.3	24.0	39.8	43.0	49.4	49.8	50.0	07
61.0	12	0.3	62					9.0	19.0	46.1	50.5	50.0	51.1	51.2	76
62.0	9	10.8	62					15.0	22.5	45.6	47.4	47.4	47.6	47.7	66
63.0	2	21.3	62						21.0	43.0	43.3	43.8	43.8	43.5	02
64.0	2	31.9	62						32.0	38.5	39.7	39.7	38.7	38.7	00
65.0	2	34.1	87						38.0	41.0	42.1	42.2	42.2	42.3	41
66.0	1	47.2	59											47.2	49
67.0	1	34.5	83											34.5	83
68.0	1	38.1	84											38.1	84
69.0	1	42.6	100											42.6	100
70.0	1	42.1	108											42.1	108

SCALAR WIND

TABLE 1.6

DATA SOURCE							JUNE									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	0.0														
1.0	720	0.0				0.0	0.4	1.0	0.7	2.4	4.8	6.7	7.6	8.3	11.0	210
2.0	720	0.0							2.0	4.5	7.8	11.0	13.6	15.8	25.0	112
3.0	720	0.0				0.0	0.2	0.9	1.9	4.3	8.0	11.2	13.9	18.7	27.0	260
4.0	720	0.0				0.0	0.3	0.7	2.0	4.5	8.3	12.7	15.5	18.7	27.0	250
5.0	720	0.0				0.0	0.3	0.9	2.0	4.8	9.1	12.8	15.7	18.9	32.0	237
6.0	720	0.0				0.2	0.5	1.1	2.4	5.3	9.9	13.7	17.3	20.4	25.5	
7.0	720	0.0				0.3	0.9	1.4	2.9	6.0	11.3	15.8	19.8	22.9	27.0	212
8.0	720	0.0				0.3	0.9	1.4	3.1	7.0	12.0	18.7	21.8	23.9	28.0	
9.0	720	0.0				0.1	0.4	2.1	3.9	8.3	14.4	21.2	25.4	27.4	32.0	290
10.0	720	0.0				0.0	0.1	0.5	2.4	4.6	9.8	17.5	25.2	30.1	31.9	
11.0	720	0.0				0.1	0.7	2.8	5.2	11.2	20.5	29.2	33.5	37.4	47.0	310
12.0	720	0.0				0.1	0.7	3.0	6.0	12.8	24.1	34.2	37.2	41.4	53.0	227
13.0	720	0.0				0.1	0.7	3.0	6.9	13.5	25.7	35.6	42.2	44.9	57.0	229
14.0	720	0.0				0.1	0.7	3.0	6.5	12.3	23.0	33.0	37.2	40.4	48.0	298
15.0	720	0.0				0.0	0.6	2.6	5.0	10.4	18.9	26.3	28.7	30.7	37.0	250
16.0	720	0.0				0.0	0.6	2.6	3.8	7.7	13.0	17.6	19.9	20.9	22.7	
17.0	720	0.0				0.2	0.6	1.2	2.7	5.8	9.6	12.7	14.9	15.8	20.0	49
18.0	720	0.0				0.3	0.9	1.5	2.8	5.6	9.1	11.9	12.9	14.9	21.0	58
19.0	720	0.0					0.1	0.9	3.4	6.7	10.7	12.8	13.9	15.2	24.0	78
20.0	720	0.0	114				0.1	2.0	2.8	8.4	12.2	14.9	16.1	18.7	25.0	58
21.0	720	0.0	1.0				0.1	3.1	4.0	6.2	10.1	13.4	15.8	17.2	27.0	85
22.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	88
23.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	90
24.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	98
25.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	88
26.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	90
27.0	720	0.0	1.0				0.3	4.2	5.5	7.7	11.3	14.9	17.2	18.5	21.6	116
28.0	103	1.0	270			1.0	2.4	3.7	4.4	14.0	20.1	22.0	24.7	26.1	31.0	85
29.0	104	2.0	270				2.4	5.1	4.4	14.7	19.4	23.4	25.4	26.4	29.0	46
30.0	107	2.0	270				3.2	3.7	9.5	15.4	19.4	24.4	25.4	26.4	27.4	79
31.0	108	2.8	45				3.2	4.2	4.0	15.0	21.7	25.4	26.4	26.4	30.1	104
32.0	109	2.8	45			3.1	4.1	4.4	4.1	15.4	21.7	25.4	26.4	26.4	31.9	104
33.0	109	4.0	40				4.1	4.4	4.1	15.4	21.7	25.4	26.4	26.4	31.9	104
34.0	110	1.4	135			1.5	4.4	4.4	4.1	15.4	21.7	25.4	26.4	26.4	31.9	104
35.0	111	1.0					4.4	4.4	4.1	15.4	21.7	25.4	26.4	26.4	31.9	104
36.0	111	1.4	135			4.1	5.4	4.4	4.1	15.4	21.7	25.4	26.4	26.4	31.9	104
37.0	110	4.1	104			7.1	7.4	10.4	12.0	20.0	24.0	29.4	31.7	33.4	35.4	49
38.0	110	7.3	64			9.1	10.4	11.4	15.4	21.4	24.4	29.4	31.7	33.4	35.4	49
39.0	110	4.2	104			9.3	11.4	12.4	17.4	23.4	30.4	34.4	36.7	37.0	37.4	47
40.0	110	10.9	101			12.1	13.1	13.0	18.4	25.4	32.4	35.4	36.4	37.4	40.0	47
41.0	110	10.8	56			12.1	14.4	16.4	20.4	25.4	33.4	37.4	40.7	39.4	44.7	41
42.0	109	15.5	75			17.1	17.4	18.4	21.7	27.0	36.4	40.7	43.4	47.0	51.4	79
43.0	109	15.9	87			21.1	18.4	20.7	23.0	30.7	34.9	42.4	45.4	46.4	46.4	48
44.0	109	21.3	87				22.4	23.4	24.4	34.0	40.4	44.4	46.4	47.0	50.2	43
45.0	109	23.0	100				23.4	24.4	25.4	34.0	40.4	44.4	46.4	47.0	50.2	43
46.0	108	21.0	94			21.1	22.4	23.4	24.4	34.0	40.4	44.4	46.4	47.0	50.2	43
47.0	107	24.0	93				24.4	25.4	26.4	34.0	40.4	44.4	46.4	47.0	50.2	43
48.0	101	22.6	107				24.4	25.4	26.4	34.0	40.4	44.4	46.4	47.0	50.2	43
49.0	100	20.7	104			21.0	24.4	25.4	26.4	34.0	40.4	44.4	46.4	47.0	50.2	43
50.0	92	20.7	101				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
51.0	89	21.0	97				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
52.0	89	19.7	120				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
53.0	74	14.9	110				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
54.0	74	16.1	102				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
55.0	70	0.2	15				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
56.0	66	21.4	101				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
57.0	62	6.7	297				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
58.0	52	0.9	112				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
59.0	40	12.2	125				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
60.0	31	15.6	21				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
61.0	23	7.3	74				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
62.0	14	4.1	353				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
63.0	6	11.9	122				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
64.0	2	50.8	85				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
65.0	2	54.5	79				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
66.0	1	60.5	72				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
67.0	1	61.4	69				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43
68.0	1	61.6	66				25.4	26.4	27.4	34.0	40.4	44.4	46.4	47.0	50.2	43

SCALAR WIND

TABLE 1.1.7

DATA SOURCE							JULY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	+0.0						+0.4	+2.4	+4.3	+5.7	+6.7	+7.5	+8.7	+9.0	
1.0	744	+0.0			+0.1	+0.4	+1.0	+2.1	+4.5	+7.7	+10.9	+12.6	+14.2	+24.9	+28.0	214
2.0	744	+0.0			+0.0	+0.2	+0.6	+1.6	+4.0	+7.7	+10.9	+12.9	+14.7	+22.9	+25.0	224
3.0	744	+0.0			+0.0	+0.2	+0.7	+1.7	+4.0	+7.8	+10.8	+12.2	+15.1	+20.6	+21.0	
4.0	744	+0.0			+0.0	+0.2	+0.6	+1.8	+4.4	+8.2	+11.1	+12.7	+14.3	+20.6	+23.0	248
5.0	744	+0.0			+0.1	+0.3	+0.9	+2.0	+4.4	+8.1	+10.7	+12.5	+14.8	+18.6	+19.0	
6.0	744	+0.0			+0.0	+0.2	+0.7	+2.0	+4.6	+8.0	+11.1	+13.0	+15.5	+20.9	+24.0	245
7.0	744	+0.0			+0.0	+0.3	+0.9	+2.0	+4.8	+8.3	+11.0	+13.1	+14.8	+18.9	+20.0	35
8.0	744	+0.0			+0.0	+0.3	+1.0	+2.4	+5.0	+9.2	+12.4	+14.6	+16.3	+20.9	+25.0	38
9.0	744	+0.0			+0.2	+0.7	+1.2	+2.5	+5.9	+10.7	+14.9	+17.5	+19.6	+25.9	+29.0	35
10.0	744	+0.0		+0.0	+0.3	+0.8	+1.3	+3.0	+7.1	+12.1	+17.7	+20.7	+24.5	+30.9	+32.0	140
11.0	744	+0.0		+0.0	+0.5	+1.1	+1.6	+3.6	+8.2	+14.1	+19.5	+23.5	+28.8	+33.9	+35.0	190
12.0	744	+1.0			+1.0	+1.4	+2.2	+4.5	+9.1	+16.3	+22.7	+26.2	+28.5	+33.9	+35.0	130
13.0	744	+0.0		+0.0	+0.7	+1.6	+2.7	+5.3	+10.8	+17.8	+23.9	+28.7	+32.2	+37.9	+42.0	130
14.0	744	+1.0			+1.1	+1.9	+2.8	+5.2	+10.1	+16.7	+21.5	+24.8	+29.5	+34.9	+38.0	44
15.0	744	+1.0			+1.6	+2.4	+4.0	+8.5	+13.9	+17.8	+20.8	+24.3	+29.9	+31.0	41	
16.0	744	+0.0		+0.0	+0.4	+1.1	+1.8	+3.4	+6.9	+11.4	+14.3	+16.2	+18.8	+20.9	+22.0	60
17.0	744	+1.0			+1.4	+2.2	+4.0	+7.0	+10.5	+12.6	+14.9	+17.4	+19.4	+20.0		
18.0	744	+1.0			+2.2	+2.8	+3.6	+5.5	+8.3	+11.4	+13.2	+14.5	+15.5	+17.9	+18.0	86
19.0	744	+3.0			+3.6	+4.9	+5.8	+7.6	+10.4	+13.2	+14.9	+16.2	+17.6	+19.9	+25.0	73
20.0	744	+2.0	107	+2.0	+4.4	+5.8	+7.1	+9.3	+12.6	+16.2	+18.7	+21.2	+24.4	+28.0	+31.0	
21.0	744	+5.0			+7.0	+8.2	+9.2	+11.3	+14.5	+18.3	+20.8	+22.2	+24.4	+29.1	+31.0	100
22.0	744	+9.0			+9.7	+10.4	+11.4	+13.0	+15.9	+19.5	+22.0	+23.3	+25.5	+26.9	+33.0	87
23.0	744	+8.0	96	+9.0	+10.3	+11.0	+12.1	+13.9	+17.1	+20.8	+22.8	+24.1	+26.2	+28.9	+33.0	90
24.0	744	+8.0	71	+8.0	+10.8	+11.8	+12.7	+14.8	+18.3	+21.7	+24.4	+25.5	+26.2	+28.9	+32.0	80
25.0	744	+9.0			+10.4	+11.4	+12.7	+15.0	+19.2	+22.8	+25.5	+27.2	+30.6	+31.0		
26.0	744	+8.0			+10.5	+11.4	+12.5	+15.1	+19.9	+23.9	+26.7	+28.3	+29.8	+33.9	+35.0	100
27.0	744	+4.0	83	+6.0	+9.3	+10.7	+12.4	+14.8	+20.0	+24.9	+27.9	+29.9	+31.5	+32.9	+36.0	100
28.0	105	9.8	114				11.4	12.9	15.0	20.4	25.7	27.4	30.4	31.0	31.6	82
29.0	104	9.6	108			10.1	11.2	13.7	17.2	21.4	26.2	28.0	30.4	31.0	34.5	97
30.0	111	12.6	91				13.9	16.7	22.3	26.2	28.7	31.6	32.9	34.5	39.5	100
31.0	112	11.3	112			11.4	12.5	14.5	16.5	22.4	27.1	30.5	32.6	34.0	36.7	95
32.0	113	10.3	101			11.1	12.4	14.5	17.4	22.5	27.0	31.5	32.7	34.0	35.7	95
33.0	117	13.1	36			14.1	14.6	15.6	17.4	22.9	27.0	32.4	33.0	33.0	36.0	92
34.0	121	13.7	93				14.1	14.7	18.5	24.2	29.0	33.2	34.1	34.0	36.7	103
35.0	122	13.8	94			14.2	14.8	17.5	19.8	25.5	32.0	35.3	38.0	39.0	41.4	90
36.0	122	13.7	90			15.1	15.4	18.7	21.8	27.5	32.4	35.3	37.2	39.4	43.0	91
37.0	122	15.3	101			16.2	16.4	20.3	24.4	29.0	33.9	37.0	38.4	39.4	45.5	101
38.0	124	14.3	102			16.5	16.8	19.2	25.3	31.2	36.0	40.4	42.1	42.0	44.4	101
39.0	125	1.5	96			18.1	18.0	22.1	27.2	32.4	37.7	40.3	45.4	47.1	45.5	87
40.0	125	20.2	96			20.3	22.4	24.4	28.4	31.9	36.5	42.0	47.1	47.0	49.4	82
41.0	125	15.8	106			21.3	23.4	26.3	29.5	34.8	41.4	45.4	47.1	47.0	49.4	82
42.0	124	13.7	96			17.2	24.4	28.1	32.1	37.7	43.7	47.0	49.1	49.0	51.4	83
43.0	124	20.6	87			21.2	22.4	30.1	38.1	40.0	46.1	51.1	52.4	53.8	57.2	87
44.0	122	20.1	82			23.2	25.4	29.7	35.4	43.2	49.5	52.4	54.6	55.5	56.3	101
45.0	121	25.1	85			26.1	26.9	30.5	36.4	44.0	52.2	55.7	57.2	59.4	65.4	93
46.0	119	23.5	78			25.2	31.4	35.0	39.2	47.1	54.3	58.7	60.6	62.4	63.6	96
47.0	118	22.2	85			23.2	26.7	33.9	38.4	47.0	54.5	62.0	63.4	64.7	69.4	95
48.0	117	18.4	109			21.2	28.7	36.6	41.1	48.2	56.0	60.4	61.3	62.3	67.2	102
49.0	115	23.4	87			28.2	33.6	38.4	43.4	49.7	57.9	60.4	61.7	64.0	65.0	105
50.0	113	27.4	84			27.6	33.6	38.2	47.5	51.1	58.4	62.2	63.7	64.0	68.0	104
51.0	110	25.1	97			25.1	29.5	35.4	41.5	51.2	59.4	65.1	66.4	66.4	67.0	100
52.0	108	22.4	100			22.4	22.7	31.1	40.5	50.0	60.4	65.6	68.0	69.5	70.0	95
53.0	103	20.0	116			21.0	23.3	25.2	34.7	51.8	60.7	68.4	69.4	69.0	70.2	105
54.0	97	20.8	54			26.1	29.0	39.2	50.1	61.6	67.1	68.0	69.4	73.0	74.0	98
55.0	89	15.6	130			24.0	27.2	36.4	51.6	61.3	64.9	68.0	74.1	75.0	75.2	99
56.0	84	10.8	158			10.9	23.2	36.2	51.0	60.9	63.7	69.1	72.1	72.4	72.5	102
57.0	77	4.2	167			20.4	23.9	39.1	50.9	59.4	66.5	69.1	69.7	70.1	70.2	94
58.0	64	7.6	113			18.5	22.7	34.5	50.0	60.4	67.7	71.1	72.4	72.4	72.9	86
59.0	56	6.8	91			11.3	14.9	31.9	45.0	64.1	70.1	70.8	71.1	71.3	71.3	92
60.0	41	12.0	85				17.1	25.4	50.5	67.5	73.0	75.1	75.4	76.0	76.1	99
61.0	25	11.0	94				20.3	36.5	59.5	77.0	81.9	82.2	82.2	83.1	83.1	94
62.0	14	20.0	105					32.9	58.7	77.4	91.1	91.4	91.4	91.0	91.9	97
63.0	11	27.7	103					43.7	57.5	85.3	90.3	90.5	90.5	90.5	90.6	81
64.0	9	14.9	101					25.4	50.5	84.4	89.4	90.1	90.1	90.4	90.4	80
65.0	9	23.1	111					40.4	40.4	67.5	71.4	72.2	72.4	72.4	72.5	75
66.0	5	23.6	85						44.5	81.2	81.4	81.4	81.4	81.4	81.4	83
67.0	4	26.9	152						55.0	118.2	118.5	118.5	118.5	118.5	118.5	73
68.0	5	7.9	76						51.5	64.3	65.0	65.0	65.2	65.3	65.3	48
69.0	5	25.1	94						28.5	48.2	45.4	45.7	45.4	45.4	45.4	101
70.0	5	18.6	91						28.5	48.2	50.0	50.2	50.3	50.4	50.4	69

SCALAR WIND

TABLE 1.8

DATA SOURCE										AUGUST						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 744	0+0.0							+0+1	+2+0	+3+7	+4+9	+4+0	+6+9	+9+9	+13+0	200
1+0 744	0+0.0					+0+1	+0+7	+1+6	+4+3	+7+1	+9+7	+11+4	+12+9	+20+9	+28+0	200
2+0 744	0+0.0					+0+1	+0+5	+1+6	+4+0	+7+0	+9+4	+11+6	+13+2	+22+9	+27+0	209
3+0 744	0+0.0					+0+2	+0+7	+1+7	+4+2	+7+3	+10+0	+11+7	+14+2	+22+4	+23+0	
4+0 744	0+0.0					+0+1	+0+4	+1+0	+1+8	+4+2	+7+7	+10+4	+12+6	+14+8	+20+9	104
5+0 744	0+0.0					+0+0	+0+3	+1+0	+1+9	+4+5	+8+1	+11+8	+14+1	+17+3	+19+9	101
6+0 744	0+0.0					+0+1	+0+4	+1+0	+2+0	+4+5	+8+3	+11+7	+15+2	+17+7	+21+9	219
7+0 744	0+0.0					+0+1	+0+4	+1+0	+2+1	+4+8	+8+4	+11+7	+14+4	+18+7	+22+9	190
8+0 744	0+0.0					+0+2	+0+5	+1+1	+2+4	+5+2	+9+2	+12+6	+14+2	+18+2	+22+9	180
9+0 744	0+0.0					+0+2	+0+5	+1+2	+2+8	+5+7	+9+9	+13+9	+16+4	+18+5	+25+9	220
10+0 744	0+0.0					+0+3	+0+9	+1+5	+3+2	+6+9	+11+8	+17+1	+19+4	+22+2	+32+9	209
11+0 744	0+0.0					+0+2	+0+9	+1+7	+4+0	+7+9	+13+6	+19+4	+22+7	+25+6	+39+9	207
12+0 744	0+0.0					+0+6	+1+3	+2+3	+4+4	+9+1	+16+1	+20+7	+25+1	+29+5	+44+0	200
13+0 744	0+0.0					+0+8	+1+6	+3+0	+5+0	+10+0	+16+5	+22+1	+25+5	+29+5	+44+9	38
14+0 744	0+0.0					+0+7	+1+3	+2+1	+4+3	+8+6	+14+6	+19+5	+24+0	+27+7	+33+9	44
15+0 744	0+0.0					+0+1	+1+5	+3+0	+6+7	+11+2	+14+7	+16+8	+19+5	+24+9	+31+0	68
16+0 744	0+0.0					+0+1	+0+4	+1+0	+2+5	+5+4	+8+9	+11+9	+14+0	+19+9	+20+9	70
17+0 744	0+0.0					+0+4	+1+0	+1+5	+2+9	+6+1	+9+5	+11+9	+13+1	+13+9	+17+9	60
18+0 744	0+0.0					+1+1	+1+7	+2+8	+5+0	+7+9	+10+8	+12+9	+13+8	+15+4	+16+9	100
19+0 744	0+0.0					+3+2	+4+9	+7+2	+10+1	+13+4	+15+6	+16+7	+17+4	+21+4	+22+0	
20+0 744	+3+0 124					+5+4	+6+2	+7+1	+9+2	+12+5	+16+1	+18+5	+19+9	+22+9	+32+0	79
21+0 744	+6+0					+7+0	+8+1	+9+1	+11+1	+14+3	+17+6	+20+3	+21+5	+22+9	+23+9	89
22+0 744	+8+0					+9+2	+10+0	+11+1	+12+7	+15+8	+19+4	+21+3	+22+5	+23+7	+29+0	89
23+0 744	+4+0 70					+9+1	+10+5	+11+8	+13+7	+16+7	+20+5	+22+6	+24+0	+24+9	+26+9	90
24+0 744	+6+0 81					+9+8	+10+7	+12+2	+14+2	+17+9	+21+4	+23+9	+25+5	+26+9	+29+9	90
25+0 744	+10+0					+10+8	+11+9	+12+9	+14+9	+18+6	+22+4	+25+5	+27+2	+28+8	+31+9	82
26+0 744	+9+0					+10+1	+11+6	+12+6	+15+2	+19+1	+23+2	+26+5	+28+2	+31+1	+33+9	90
27+0 744	+9+0					+10+4	+11+6	+13+0	+15+4	+19+9	+24+2	+27+4	+29+5	+31+6	+34+9	90
28+0 110	9.2 77					11.1	12.2	13.2	16.4	20.4	24.4	26.4	27.4	29.4	29.1	98
29+0 113	12.2 81					13.1	14.1	14.6	17.4	21.4	25.4	27.4	29.4	30.4	30.4	93
30+0 113	13.0					14.1	14.7	14.7	17.2	21.4	25.4	24.7	31.4	31.4	33.4	98
31+0 115	12.7 96					14.4	14.6	14.1	14.0	22.0	27.0	30.4	32.7	33.4	41.4	98
32+0 115	11.7 110					13.2	13.2	14.4	17.0	21.0	27.4	29.4	32.4	33.0	41.1	122
33+0 115	11.2 90					11.2	11.4	10.4	17.4	22.4	27.4	30.1	32.7	34.0	37.1	91
34+0 117	10.5 103					11.2	12.7	14.4	18.2	22.6	28.4	31.4	31.7	37.4	39.2	114
35+0 114	0.0 0					10.1	10.6	13.3	17.4	22.6	29.4	33.1	36.4	39.7	39.7	97
36+0 114	1.0 360					11.2	12.7	14.0	18.2	24.4	30.4	34.1	37.7	39.4	39.4	91
37+0 120	6.5 86					10.2	11.4	13.7	18.0	25.7	31.7	35.0	36.4	39.4	39.4	95
38+0 120	4.1 120					9.1	9.4	11.0	14.4	24.4	30.4	37.5	38.4	40.4	43.1	95
39+0 120	7.8 50					8.4	8.4	13.0	14.4	24.4	31.2	40.4	43.1	43.4	45.0	95
40+0 119	4.2 76					10.2	11.7	15.0	19.4	24.4	36.2	43.0	44.4	44.4	50.0	99
41+0 117	4.5 92					9.2	12.7	16.0	21.4	24.4	36.4	41.1	42.7	45.4	47.5	89
42+0 117	1.5 103					10.4	16.7	17.0	23.4	30.4	37.4	42.7	44.4	45.4	46.4	100
43+0 117	11.6 77					12.7	16.7	17.4	24.4	31.4	38.4	44.4	47.4	49.4	50.4	83
44+0 115	4.2 78					8.2	9.4	13.4	22.4	35.1	40.4	44.4	51.4	52.0	54.1	97
45+0 114	11.9 93					14.1	15.4	17.3	22.4	30.4	44.4	52.7	57.2	57.4	62.4	98
46+0 113	15.6 77					16.1	17.1	17.4	22.7	35.1	40.4	54.1	54.4	59.4	63.4	103
47+0 110	10.6 75					13.1	15.2	16.3	22.4	37.7	45.4	56.3	60.4	61.0	64.0	79
48+0 110	4.1 70					12.1	13.4	16.5	24.4	34.4	47.5	52.4	56.4	59.0	60.7	119
49+0 104	12.4 76					12.4	14.6	15.4	24.4	34.7	46.0	53.4	56.2	56.7	57.0	84
50+0 105	9.3 141					12.1	13.2	15.3	22.4	34.7	44.2	54.4	54.4	61.0	61.4	86
51+0 105	6.5 252					10.1	11.4	15.4	22.4	34.0	40.1	55.4	59.4	62.0	72.4	68
52+0 94	1.4 124					11.4	15.4	22.4	29.4	34.0	45.4	54.2	57.4	60.4	72.4	240
53+0 96	5.8 211					11.4	12.4	14.4	34.0	45.4	54.2	57.4	60.4	72.4	71.1	135
54+0 91	7.6 157					8.1	11.2	17.2	31.4	47.4	55.4	57.2	62.0	66.1	87.1	131
55+0 83	6.0 90					6.0	11.1	15.2	32.4	43.4	50.4	64.1	91.2	92.1	92.3	128
56+0 75	2.2 157					5.7	7.0	12.0	24.4	41.1	56.3	64.4	71.4	72.2	72.1	84
57+0 61	5.2 72					4.2	9.1	12.4	23.4	45.1	57.0	62.4	68.4	69.4	68.4	85
58+0 48	4.0 90					4.1	6.2	10.2	25.0	46.2	61.4	63.4	63.4	64.0	64.0	98
59+0 37	4.8 72					6.9	11.4	24.4	41.1	60.2	63.4	64.4	64.4	64.5	64.5	104
60+0 27	4.8 206					8.4	14.4	24.4	45.7	56.7	62.4	62.4	62.4	62.4	62.4	107
61+0 27	7.3 354					8.4	14.4	24.4	41.7	70.7	72.4	72.4	72.4	72.4	72.4	111
62+0 19	3.6 124					11.0	24.4	41.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	117
63+0 16	4.9 63					9.4	14.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
64+0 10	4.4 273					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
65+0 4	14.1 116					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
66+0 7	11.9 78					13.1	14.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
67+0 6	14.1 74					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
68+0 5	4.7 63					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
69+0 4	14.4 141					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94
70+0 4	14.3 73					15.4	15.4	22.0	35.4	39.4	45.4	45.4	45.4	45.4	45.4	94

SCALAR WIND

TABLE 1.9

DATA SOURCE										SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	0.0						1.0	2.7	5.1	7.8	9.9	11.6	17.0	30	
1.0	720	0.0				0.2	0.9	2.2	5.3	9.6	14.8	20.5	22.7	32.5	33.0	
2.0	720	0.0			0.0	0.3	0.8	2.1	5.1	9.5	15.4	21.8	22.8	36.0	37.0	238
3.0	720	0.0			0.0	0.3	0.8	2.1	9.9	14.5	18.7	22.7	40.0	41.0	239	
4.0	720	0.0			0.0	0.2	0.7	1.8	15.0	14.1	18.5	21.9	36.0	37.0	248	
5.0	720	0.0			0.1	0.4	1.0	2.1	15.1	15.7	19.7	23.4	34.0	35.0	248	
6.0	720	0.0			0.1	0.6	1.2	2.5	15.8	10.2	15.0	19.5	23.6	30.0	61	
7.0	720	0.0			0.1	0.6	1.4	2.9	15.9	11.5	17.1	20.9	23.9	31.0	58	
8.0	720	1.0			1.0	1.5	3.1	6.9	12.7	18.6	23.3	26.9	30.5	31.0		
9.0	720	0.0			0.6	1.1	1.7	3.4	7.7	14.2	20.7	23.5	27.8	33.5	34.0	
10.0	720	0.0			1.0	1.5	2.2	4.3	9.2	16.2	23.4	26.2	29.9	35.0	238	
11.0	720	0.0			0.6	1.6	2.7	5.0	11.0	18.8	25.1	28.7	30.9	36.5	37.0	
12.0	720	0.0			0.8	1.5	3.1	5.9	12.3	20.9	27.6	30.1	32.8	39.0	40.0	264
13.0	720	0.0			1.0	1.6	2.8	5.8	12.6	22.2	28.8	32.1	33.9	41.0	42.0	251
14.0	720	0.0			0.8	1.2	2.4	5.3	12.0	20.2	25.9	28.3	31.9	40.0	41.0	337
15.0	720	0.0			0.7	1.3	2.1	4.4	9.2	15.7	22.1	22.8	24.9	32.0	33.0	154
16.0	720	0.0			0.3	1.0	1.6	3.1	6.5	11.4	15.0	17.5	19.8	24.0	25.0	57
17.0	720	0.0			0.2	0.6	1.1	2.3	5.1	9.0	12.1	13.8	16.3	20.0	21.0	49
18.0	720	0.0			0.1	0.4	1.0	2.2	5.0	8.8	11.5	13.0	15.1	21.0	22.0	65
19.0	720	0.0			0.4	1.0	1.6	3.1	6.2	10.2	12.5	13.5	14.7	22.0	23.0	96
20.0	720	0.0			0.6	1.4	2.4	4.4	7.9	11.8	14.6	15.8	17.5	22.0	23.0	107
21.0	720	1.0			1.8	2.9	4.1	6.0	9.5	13.0	15.5	16.7	17.9	22.0	23.0	86
22.0	720	0.0			3.0	3.7	4.5	7.3	10.6	14.1	16.4	17.9	19.9	20.8	21.0	
23.0	720	0.0			3.5	4.4	5.8	8.4	12.0	15.7	18.1	19.7	21.6	22.6	23.0	
24.0	720	2.0	158		3.1	4.4	6.2	8.4	12.0	15.0	17.5	18.8	19.8	23.6	24.0	
25.0	720	1.0	126		3.6	4.7	6.1	8.9	12.7	16.9	19.9	21.3	22.5	24.0	25.0	106
26.0	720	1.0	79		3.0	4.1	5.6	8.3	12.8	17.5	21.0	22.3	23.7	29.0	30.0	83
27.0	720	1.0	86		2.6	4.2	5.5	8.1	12.9	17.9	21.7	23.2	24.7	32.0	33.0	100
28.0	105	2.0	180		3.2	5.0	7.2	12.0	15.5	19.0	21.4	22.0	24.4	24.7	76	
29.0	107	1.0	180		3.0	3.9	7.3	12.6	17.8	20.9	24.4	24.4	26.4	26.4	99	
30.0	108	1.7	180			3.1	7.5	11.8	17.0	20.3	23.5	24.0	26.0	26.0	43	
31.0	109	0.4	180		0.4	1.5	3.4	6.7	11.5	17.4	20.3	23.5	24.0	26.0	26.2	93
32.0	109	0.0	0		0.1	1.5	3.5	6.6	11.0	17.3	19.0	22.5	23.0	27.4	27.7	101
33.0	109	2.2	117		2.3	2.7	4.5	6.8	11.1	15.5	20.2	21.0	21.0	25.5	25.5	121
34.0	109	1.0	90			2.2	5.5	10.4	15.3	21.3	21.8	22.0	22.6	22.7	100	
35.0	104	1.0	270			1.6	5.3	10.0	15.0	21.3	22.0	22.0	25.0	29.4	29.4	41
36.0	104	0.0	0		0.0	0.7	1.4	4.2	10.4	15.5	21.5	24.0	25.0	26.5	26.5	40
37.0	107	1.0	360		1.0	1.5	2.2	4.2	10.4	15.0	20.7	25.4	26.0	30.3	30.4	49
38.0	106	0.0	0		0.0	0.7	2.4	4.4	10.5	14.2	22.4	25.4	25.0	27.0	27.0	144
39.0	106	1.0	90			2.2	3.2	5.4	11.0	14.7	22.7	23.4	24.4	25.2	25.3	72
40.0	105	1.0	270		1.1	2.2	3.4	5.4	10.4	19.3	24.4	25.4	26.0	29.2	29.4	95
41.0	102	1.0	180			1.2	2.5	4.7	10.8	21.2	26.4	29.7	31.0	35.3	35.4	105
42.0	102	1.4	105		1.4	1.4	2.3	5.3	10.5	21.0	29.0	32.7	33.0	42.0	42.2	85
43.0	100	1.4	225		1.0	2.1	3.3	5.8	11.5	24.7	31.0	36.7	38.0	40.2	40.4	47
44.0	99	0.0				1.3	2.4	5.2	12.1	25.3	33.1	36.0	41.0	42.0	42.1	88
45.0	95	2.6	29			3.1	4.1	5.2	10.8	29.0	29.5	33.0	42.1	43.0	43.2	103
46.0	94	2.8	135			3.8	5.7	10.1	19.5	27.3	32.0	39.1	40.2	40.4	40.4	151
47.0	86	0.0	0			1.5	3.1	5.4	11.4	20.5	26.7	29.0	30.1	30.9	31.0	48
48.0	85	1.4	135		1.0	3.0	5.1	10.0	20.5	25.4	28.1	29.2	29.0	30.0	30.0	120
49.0	83	0.0	0		0.4	2.1	4.0	11.3	19.0	25.4	27.1	29.2	30.2	30.3	31.1	118
50.0	81	1.4	135		1.4	3.0	6.0	12.1	19.4	25.4	29.2	32.2	33.1	33.3	33.3	127
51.0	76	1.0	360		3.2	3.7	6.0	12.4	21.3	25.2	32.3	36.2	36.8	36.8	36.9	139
52.0	66	1.0	90		1.5	2.7	5.3	12.2	23.3	29.4	31.4	33.5	34.3	34.3	34.4	105
53.0	61	1.0				5.0	5.0	13.4	21.3	29.0	31.0	31.0	33.5	33.5	33.5	89
54.0	58	2.2	243		2.4	4.9	7.6	13.0	22.5	29.1	30.7	32.5	33.1	33.4	33.5	99
55.0	55	2.2	207		4.1	4.4	7.4	12.7	22.1	31.1	31.0	34.4	35.0	35.0	35.1	148
56.0	46	1.9	197		2.0	4.1	5.3	13.3	20.6	23.9	26.0	34.4	35.0	35.1	35.1	148
57.0	37	2.2	153			3.3	5.2	12.4	21.1	27.2	29.1	29.4	29.4	29.9	29.9	143
58.0	31	4.4	231			5.6		9.3	15.1	24.1	29.5	35.3	35.8	36.1	36.1	248
59.0	20	7.6	157				10.2	14.5	24.4	26.0	29.0	29.7	29.8	29.8	29.8	256
60.0	12	4.7	204				7.9	16.0	33.5	35.4	36.4	36.4	36.9	36.9	36.9	257
61.0	4	4.3	212				8.1	13.0	45.7	47.4	48.2	48.4	48.4	48.4	48.4	308
62.0	6	12.8	219					19.0	72.0	72.0	72.0	72.0	73.0	73.0	73.0	306
63.0	6	13.2	251					20.0	97.0	97.4	97.4	97.9	97.9	97.9	97.9	124
64.0	2	5.9	329					6.0	17.7	17.0	14.0	14.0	14.0	14.0	14.0	317
65.0	1	47.1	317													
66.0	1	61.1	318													
67.0	1	43.8	322													
68.0	1	37.6	328													
69.0	1	29.3	331													
70.0	1	1.9	292													

SCALAR WIND

TABLE 1.10

DATA SOURCE							OCTOBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	0.0					0.3	1.4	5.6	7.9	9.3	12.1	14.6	15.0
1.0	744	0.0			0.0	0.5	1.2	2.9	6.0	10.4	13.9	15.8	17.1	19.9
2.0	744	0.0			0.0	0.4	1.0	2.2	5.5	9.9	14.1	16.2	18.8	23.4
3.0	744	0.0			0.0	0.4	1.1	2.4	5.8	11.0	14.7	18.2	20.7	26.9
4.0	744	0.0			0.2	0.8	1.3	2.9	6.7	11.6	16.4	20.4	25.2	29.9
5.0	744	0.0			0.5	1.1	1.8	3.7	7.9	13.7	19.3	23.0	28.7	34.9
6.0	744	0.0			1.0	1.3	2.1	4.4	9.5	16.0	22.8	26.0	29.7	39.9
7.0	744	1.0			1.0	1.5	2.6	5.4	11.6	18.9	26.8	31.2	34.5	45.9
8.0	744	1.0			1.1	1.7	3.1	6.2	14.0	22.8	31.6	35.6	39.2	51.9
9.0	744	1.0			1.3	2.4	4.0	7.6	16.5	26.8	36.9	42.8	45.5	56.9
10.0	744	1.0			1.4	2.6	4.5	9.3	19.7	31.7	42.1	47.5	50.8	60.0
11.0	744	1.0	332	1.0	2.1	2.9	4.7	10.9	22.6	34.5	44.3	49.6	53.7	73.9
12.0	744	0.0		0.0	2.2	3.6	6.0	11.6	24.1	38.7	44.3	50.7	56.7	69.9
13.0	744	0.0			2.3	4.2	6.2	11.6	23.6	37.6	45.2	49.7	52.5	67.0
14.0	744	1.0			2.0	3.4	5.3	10.6	21.4	33.0	40.4	45.0	49.8	58.9
15.0	744	1.0			1.9	2.6	4.1	8.2	17.6	26.4	33.9	37.6	41.5	50.9
16.0	744	1.0			1.1	1.7	2.9	5.7	12.3	20.7	25.8	29.8	35.5	41.6
17.0	744	1.0					1.7	3.5	7.4	14.0	19.9	24.3	28.1	33.0
18.0	744	0.0		0.0	0.0	0.4	0.9	2.0	4.6	8.6	13.7	17.5	22.5	26.9
19.0	744	0.0			0.0	0.3	0.8	1.7	3.8	7.0	10.3	12.5	14.9	18.0
20.0	744	0.0			0.0	0.3	0.8	1.7	4.0	7.1	8.9	10.8	11.1	17.9
21.0	744	1.0	90		0.1	0.3	1.0	1.8	4.2	7.5	9.3	10.3	11.6	14.9
22.0	744	0.0			0.2	0.6	1.1	2.1	4.5	8.1	10.3	11.3	12.5	13.9
23.0	744	0.0			0.0	0.4	1.0	2.2	4.9	8.4	11.1	12.5	13.5	14.9
24.0	744	0.0			0.2	0.5	1.1	2.2	4.9	8.9	11.3	12.3	13.8	15.7
25.0	744	0.0			0.0	0.3	0.9	2.3	5.1	8.9	11.5	12.4	12.9	14.9
26.0	744	0.0			0.0	0.4	1.0	2.3	5.1	9.2	12.3	13.7	14.8	16.4
27.0	744	0.0			0.2	0.7	1.2	2.5	5.3	9.2	12.7	14.2	15.9	16.9
28.0	74	1.0	360				1.2	2.8	5.4	9.4	12.1	14.2	17.1	18.1
29.0	82	0.5	360				2.0	3.2	6.5	10.0	12.4	13.4	15.2	16.1
30.0	84	1.0	270				1.7	3.1	6.5	9.4	11.4	14.5	20.2	21.1
31.0	85	0.5	104				1.8	3.1	7.5	12.1	19.4	20.5	21.9	22.0
32.0	90	1.0	90			1.9	4.0	4.5	10.5	20.5	23.0	25.7	26.2	26.1
33.0	90	1.7	70				4.4	4.4	15.0	23.3	26.5	32.1	33.1	33.2
34.0	90	1.0	62				1.5	3.3	9.4	21.2	27.2	28.0	29.1	30.0
35.0	90	2.1	106			2.9	2.9	5.4	12.8	23.4	30.9	35.0	37.1	38.1
36.0	91	1.2	323			2.8	4.4	4.4	13.5	24.0	29.0	34.0	34.1	34.0
37.0	90	1.9	357			3.8	5.4	4.4	13.0	26.0	33.5	35.0	40.0	40.0
38.0	89	2.2	243			3.0	3.6	5.4	13.5	29.4	35.4	34.0	43.1	43.4
39.0	94	1.3	105			1.6	3.2	6.0	14.4	34.0	40.7	43.0	45.1	45.7
40.0	95	0.0	0			2.1	2.9	6.4	15.0	35.7	45.3	46.0	49.1	50.2
41.0	94	2.4	214			3.0	5.7	6.0	16.0	36.5	50.1	51.0	53.1	53.4
42.0	97	2.0	90			3.5	5.6	8.1	20.4	39.6	53.2	55.0	59.0	59.7
43.0	97	0.5	90			3.5	5.2	8.5	21.0	40.6	55.2	56.0	60.7	61.1
44.0	94	1.9	315			2.0	2.9	10.6	29.7	40.1	54.3	51.0	62.5	62.9
45.0	92	1.4	140			3.5	4.8	9.4	26.5	46.4	56.2	51.0	65.1	65.7
46.0	93	1.0	140			6.7	11.4	24.4	47.1	54.2	60.0	67.1	67.4	67.9
47.0	91	3.8	204			5.1	6.8	12.4	31.4	49.4	59.4	61.0	69.1	69.0
48.0	89	4.0	252			4.5	4.2	13.1	33.5	52.0	61.4	65.5	77.1	78.1
49.0	86	4.5	153			5.5	6.7	13.4	35.0	58.2	66.7	74.0	86.1	86.5
50.0	84	5.1	191				6.1	17.2	34.3	50.7	72.4	74.1	92.1	92.5
51.0	79	3.2	194			3.8	5.0	15.8	37.8	57.5	74.1	83.1	83.0	84.4
52.0	75	4.2	256				7.3	17.0	39.4	59.4	74.3	84.1	95.1	95.5
53.0	70	3.6	256			4.4	7.5	19.1	43.0	60.5	76.5	83.0	84.0	80.0
54.0	63	6.3	252				7.2	19.0	43.4	65.0	73.0	79.0	80.0	80.0
55.0	57	5.2	304			5.9	8.0	22.0	43.8	62.0	74.2	80.7	83.3	83.4
56.0	48	4.9	294			6.1	10.4	19.3	43.0	60.2	74.3	79.0	79.0	80.5
57.0	40	5.1	241			7.0	22.9	43.0	60.7	76.5	85.1	85.4	86.2	86.3
58.0	34	5.0	233				16.4	45.5	61.8	73.3	74.2	74.6	74.4	74.3
59.0	27	11.3	292			11.4	15.3	48.3	62.7	73.7	74.7	74.4	74.4	74.0
60.0	22	7.2	326			9.1	17.5	50.0	64.5	73.0	83.3	83.5	83.5	83.5
61.0	14	14.5	260					49.0	71.4	87.4	87.0	84.2	84.4	84.4
62.0	4	27.7	253					45.0	79.4	72.0	74.0	73.1	73.1	73.1
63.0	2	34.8	242					39.0	87.0	87.4	87.0	87.4	87.4	87.4
64.0	1	39.1	274											274
65.0	1	47.2	265											265
66.0	1	28.4	262											262
67.0	1	14.7	252											252
68.0	1	5.0	262											262
69.0	1	4.4	252											252
70.0	1	23.0	252											252

SCALAR WIND

TABLE 1.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	0+0.0						+1.1	+2.7	+5.5	+7.4	+8.5	+9.5	+11.4	+12.0	
1.0	720	+1.0				+1.0	+1.8	+3.3	+6.5	+10.8	+14.0	+17.8	+19.9	+23.5	+24.0	
2.0	720	0+0.0			+0.2	+0.7	+1.3	+2.9	+6.1	+11.3	+17.3	+20.5	+24.7	+32.0	+33.0	232
3.0	720	0+0.0			+0.2	+0.7	+1.3	+3.0	+6.7	+13.5	+20.7	+22.9	+27.4	+36.5	+37.0	
4.0	720	0+0.0			+0.3	+1.0	+1.6	+3.4	+8.4	+15.7	+23.4	+26.3	+29.9	+37.0	+38.0	257
5.0	720	+1.0			+1.2	+2.2	+4.9	+10.7	+19.6	+34.4	+49.4	+54.8	+59.9	+73.0	+74.0	
6.0	720	0+0.0			+1.0	+1.8	+3.1	+6.4	+13.4	+23.1	+30.8	+34.8	+38.9	+51.0	+52.0	266
7.0	720	0+0.0			+1.5	+2.7	+4.5	+8.4	+16.7	+28.5	+43.3	+49.6	+54.9	+70.0	+71.0	270
8.0	720	+1.0			+2.1	+3.3	+5.7	+11.0	+19.7	+30.4	+40.5	+45.5	+49.9	+65.0	+66.0	
9.0	720	+2.0			+2.5	+4.0	+7.1	+13.0	+23.3	+33.9	+45.1	+49.5	+54.8	+73.0	+74.0	
10.0	720	+2.0			+4.0	+5.4	+8.1	+15.0	+26.6	+38.6	+48.7	+54.2	+63.9	+93.0	+94.0	247
11.0	720	+3.0	316		+5.5	+7.2	+10.5	+17.2	+29.5	+42.4	+54.0	+60.2	+71.8	+99.0	+100.0	250
12.0	720	+2.0	204		+6.7	+9.4	+12.3	+19.2	+32.1	+44.2	+53.0	+64.4	+71.8	+97.0	+98.0	250
13.0	720	+2.0	273		+9.1	+12.0	+13.0	+20.6	+32.1	+43.9	+52.0	+59.7	+66.9	+93.0	+94.0	250
14.0	720	+3.0	295		+7.7	+9.4	+11.5	+18.5	+29.2	+40.3	+46.8	+52.5	+60.8	+73.0	+74.0	250
15.0	720	+1.0	310		+5.0	+6.5	+9.8	+16.0	+25.4	+33.4	+39.7	+43.4	+48.8	+64.0	+65.0	214
16.0	720	+2.0			+3.1	+4.8	+7.4	+12.1	+20.8	+27.9	+32.8	+38.2	+37.7	+51.0	+52.0	255
17.0	720	+2.0			+2.2	+3.1	+4.8	+8.3	+15.2	+22.0	+27.2	+30.1	+31.9	+44.0	+45.0	190
18.0	720	0+0.0			+1.0	+2.0	+2.7	+5.2	+10.5	+16.2	+21.0	+22.9	+25.5	+30.0	+31.0	267
19.0	720	0+0.0			+0.5	+1.0	+1.6	+3.4	+6.9	+11.6	+16.4	+18.8	+21.8	+30.0	+31.0	261
20.0	720	0+0.0			+0.1	+0.6	+1.1	+2.2	+5.1	+9.2	+14.2	+16.6	+20.2	+25.5	+26.0	
21.0	720	0+0.0			+0.1	+0.4	+1.0	+2.1	+4.6	+8.6	+13.1	+15.8	+20.4	+28.0	+29.0	246
22.0	720	0+0.0			+0.0	+0.3	+0.9	+2.0	+4.8	+8.8	+13.6	+17.7	+19.9	+28.5	+29.0	
23.0	720	0+0.0			+0.0	+0.3	+1.0	+2.4	+5.5	+9.6	+14.6	+17.9	+20.9	+29.0	+30.0	258
24.0	720	0+0.0			+0.2	+0.8	+1.4	+3.0	+6.5	+11.3	+15.8	+18.9	+20.7	+25.0	+26.0	258
25.0	720	0+0.0			+0.3	+0.8	+1.4	+3.4	+8.2	+13.5	+17.9	+20.6	+23.4	+35.0	+36.0	278
26.0	720	0+0.0			+0.8	+1.4	+2.2	+4.3	+9.5	+15.6	+22.1	+24.9	+29.9	+34.0	+35.0	275
27.0	720	+1.0			+1.1	+1.9	+2.6	+4.9	+11.4	+18.3	+22.0	+23.7	+25.9	+33.0	+34.0	265
28.0	84	1.4			1.4	2.5	5.5	13.4	21.0	25.6	27.4	29.1	29.0	30.1	30.1	274
29.0	90	1.1	257		1.1	3.5	7.4	16.3	28.4	29.4	31.0	33.1	34.2	34.4	34.4	252
30.0	90	1.0	40		3.0	5.5	9.1	14.5	27.4	34.2	35.0	35.7	36.2	36.3	36.3	255
31.0	91	1.4	60		4.1	7.6	9.5	20.4	29.3	35.2	36.0	40.1	40.7	40.7	40.7	275
32.0	91	4.0	160			4.5	11.4	23.5	33.2	37.7	40.0	44.0	44.4	44.4	44.4	274
33.0	92	2.8	224		4.1	7.6	15.2	25.6	36.6	43.2	44.4	45.1	45.0	46.0	46.0	272
34.0	92	4.4	196		4.5	10.3	17.4	28.4	40.1	44.4	46.0	44.1	44.4	49.0	49.0	253
35.0	92	4.7	45		6.5	11.3	19.4	30.4	42.1	48.4	50.0	51.4	52.1	52.2	52.3	
36.0	90	7.5	227		8.0	12.5	20.4	31.4	44.2	49.4	54.0	55.1	55.4	55.3	55.3	263
37.0	91	7.2	30		8.5	14.6	21.7	34.4	46.4	52.5	56.0	60.4	60.4	60.4	60.4	244
38.0	95	6.0	21		13.1	14.4	23.0	37.0	49.3	55.1	57.4	66.0	66.4	66.4	66.4	245
39.0	94	4.0	10		6.4	17.7	25.7	40.7	52.5	55.3	59.0	64.1	64.4	64.4	64.4	247
40.0	93	4.0	140		13.1	19.7	27.7	43.4	54.1	60.4	61.0	70.1	70.4	70.4	70.4	248
41.0	93	4.0	334		14.1	19.2	31.3	45.2	57.1	61.5	62.0	71.1	71.7	71.4	71.4	248
42.0	93	5.3	341		16.1	18.7	33.4	47.4	60.1	65.4	67.0	72.1	72.6	72.7	72.7	247
43.0	92	5.7	331		14.0	20.6	34.6	50.0	64.5	70.4	71.4	71.4	74.4	74.4	74.4	246
44.0	84	16.9	296		19.5	25.4	35.0	54.3	69.4	74.4	85.4	85.4	85.4	85.4	85.4	
45.0	87	14.9	290		20.5	24.4	40.3	59.3	73.2	84.7	94.4	94.4	94.4	94.4	94.4	241
46.0	86	10.8	304		23.0	29.3	42.4	60.0	80.3	94.7	99.4	102.2	103.3	103.4	103.4	240
47.0	83	4.5	315		24.0	30.2	46.1	67.2	83.3	96.0	102.1	105.2	105.0	106.1	106.1	241
48.0	82	9.9	315		30.4	36.1	46.7	72.2	89.0	96.0	102.1	104.2	105.0	105.1	105.1	242
49.0	85	14.2	309		32.9	39.3	48.5	72.5	92.5	97.0	105.1	107.2	108.0	108.1	108.1	249
50.0	84	14.9	300		28.4	35.2	52.3	75.0	91.4	99.0	105.1	117.1	117.4	117.5	117.5	242
51.0	77	14.0	293		27.4	33.9	52.1	75.4	94.0	103.2	105.2	112.2	112.4	112.7	112.7	256
52.0	74	12.5	299		27.7	30.7	51.0	74.4	91.1	102.7	105.7	112.3	113.0	113.1	113.1	248
53.0	70	10.6	311		27.6	31.5	56.1	77.4	92.0	106.5	113.4	114.2	114.3	114.3	114.3	254
54.0	61	7.8	320		29.4	39.1	60.7	79.4	97.2	112.3	112.0	119.4	119.3	119.4	119.4	245
55.0	52	4.6	324		29.2	37.6	57.3	79.0	95.7	106.2	106.0	113.4	113.4	113.4	113.4	252
56.0	47	7.8	310		28.1	30.4	58.5	79.3	99.5	107.7	108.4	111.0	111.7	111.7	111.7	243
57.0	45	10.8	292		27.0	29.3	59.1	77.4	98.4	108.4	112.4	117.4	117.4	117.4	117.4	265
58.0	34	27.4	252			31.0	59.0	77.0	96.0	110.1	124.1	124.1	124.1	124.7	124.7	265
59.0	29	31.3	249			41.5	63.6	81.5	98.4	107.4	107.0	108.1	108.3	108.3	108.3	247
60.0	21	40.4	240			42.1	69.3	85.3	100.7	113.0	113.0	113.7	113.4	113.4	113.4	240
61.0	16	39.7	247				65.5	77.0	91.5	119.2	119.4	119.7	119.4	119.4	119.4	256
62.0	15	40.7	268				67.4	79.5	88.4	124.3	124.4	125.1	125.3	125.3	125.3	259
63.0	11	35.0	277				58.7	74.5	97.3	94.5	99.1	99.4	99.4	99.4	99.4	245
64.0	7	54.1	266				55.1	74.3	84.9	134.3	134.3	134.3	134.3	134.3	134.3	275
65.0	6	44.1	253					65.0	82.0	82.7	82.0	82.0	83.0	83.0	83.0	248
66.0	4	51.7	215					55.0	71.5	72.0	72.1	72.2	72.2	72.2	72.2	248
67.0	4	26.8	286					35.0	65.3	65.6	65.7	65.4	65.4	65.4	65.4	278
68.0	4	14.3	304					33.0	92.4	92.4	92.0	93.0	93.0	93.0	93.0	259
69.0	3	21.7	17					36.5	71.4	71.7	71.4	71.4	71.4	71.4	71.4	242
70.0	2	37.3	44					37.0	98.4	95.1	95.2	95.2	95.3	95.3	95.3	247

SCALAR WIND

TABLE 1.12

DATA SOURCE										DECEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	+0.0						+1.2	+2.8	+5.4	+7.7	+8.6	+9.3	+10.9	+12.0	280
1.0	744	+0.0			+0.4	+1.0	+1.5	+3.3	+7.0	+11.3	+15.3	+18.0	+19.7	+22.9	+26.0	211
2.0	744	+0.0			+0.3	+0.9	+1.5	+3.2	+6.8	+12.8	+18.8	+21.6	+24.7	+31.9	+36.0	241
3.0	744	+1.0			+1.1	+1.7	+3.5	+8.9	+15.9	+22.9	+26.6	+30.1	+35.9	+37.0	243	
4.0	744	+1.0			+1.2	+1.7	+2.5	+5.0	+12.0	+20.1	+27.4	+30.6	+35.8	+39.9	+42.0	240
5.0	744	+1.0			+1.6	+2.4	+3.5	+6.9	+14.8	+24.1	+31.7	+37.4	+41.2	+46.9	+52.0	250
6.0	744	+1.0	100	+1.0	+2.4	+3.7	+5.2	+8.8	+18.3	+27.9	+35.7	+42.0	+46.2	+49.9	+55.0	254
7.0	744	+1.0			+4.0	+4.7	+6.6	+10.9	+21.5	+31.8	+41.4	+46.2	+52.5	+60.9	+68.0	252
8.0	744	+1.0			+4.3	+5.9	+8.0	+12.6	+24.8	+37.3	+48.1	+52.5	+59.5	+67.9	+70.0	243
9.0	744	+1.0			+5.2	+6.8	+8.7	+14.4	+28.2	+42.4	+52.4	+59.0	+62.5	+71.9	+73.0	240
10.0	744	+2.0	44	+4.0	+5.7	+8.1	+10.6	+16.6	+31.9	+47.1	+57.8	+64.5	+71.5	+76.9	+85.0	238
11.0	744	+3.0	255	+3.0	+6.2	+9.1	+11.5	+18.8	+34.8	+50.6	+61.1	+67.0	+72.2	+89.9	+92.0	234
12.0	744	+4.0	129	+4.0	+7.7	+9.7	+13.1	+20.8	+37.7	+53.4	+63.8	+71.0	+75.1	+99.4	+100.0	
13.0	744	+3.0	118	+4.0	+9.4	+11.1	+15.3	+21.6	+38.0	+52.1	+62.9	+69.0	+75.7	+80.9	+96.0	251
14.0	744	+2.0	194	+2.0	+8.6	+12.5	+15.2	+21.3	+35.4	+48.1	+58.9	+64.3	+73.5	+80.9	+84.0	240
15.0	744	+3.0			+8.4	+11.3	+14.5	+19.9	+31.4	+43.2	+50.9	+56.7	+64.5	+72.9	+76.0	240
16.0	744	+2.0	170	+2.0	+7.3	+9.4	+12.3	+17.2	+27.2	+36.0	+42.5	+48.3	+58.5	+61.9	+64.0	255
17.0	744	+2.0	212	+2.0	+5.6	+7.9	+10.2	+14.0	+22.2	+29.8	+36.2	+41.0	+47.2	+56.9	+58.0	256
18.0	744	+2.0			+3.3	+4.6	+6.3	+9.5	+16.3	+24.2	+29.9	+33.2	+35.8	+41.6	+42.0	
19.0	744	+0.0		+0.0	+1.2	+2.2	+3.3	+5.7	+10.6	+19.0	+24.9	+27.8	+32.5	+36.9	+38.0	256
20.0	744	+0.0		+0.0	+0.4	+1.0	+1.6	+3.5	+7.6	+14.6	+21.7	+25.2	+30.7	+35.9	+38.0	256
21.0	744	+0.0		+0.0	+0.3	+0.8	+1.3	+2.7	+7.1	+13.5	+18.8	+23.0	+30.2	+34.9	+36.0	240
22.0	744	+1.0				+1.5	+3.2	+7.1	+13.1	+18.3	+22.0	+24.5	+29.9	+32.0	+32.0	250
23.0	744	+0.0		+0.0	+0.8	+1.3	+2.0	+3.7	+8.3	+14.3	+20.1	+22.0	+27.7	+30.9	+36.0	277
24.0	744	+0.0		+0.0	+1.0	+1.5	+2.5	+4.8	+9.7	+17.2	+22.5	+26.4	+30.2	+35.9	+38.0	275
25.0	744	+1.0			+1.2	+2.0	+3.5	+6.1	+12.0	+20.0	+26.3	+28.8	+33.2	+38.9	+42.0	242
26.0	744	+1.0			+1.2	+2.5	+3.7	+7.0	+14.0	+22.0	+29.0	+33.0	+36.5	+38.9	+41.0	241
27.0	744	+0.0		+0.0	+1.4	+2.9	+4.1	+8.3	+15.7	+23.8	+28.9	+33.8	+36.5	+42.9	+45.0	271
28.0	139	2.8	315		3.8	4.1	5.4	9.7	17.3	26.2	30.1	31.0	32.7	35.1	36.4	260
29.0	139	2.8	154		2.6	5.0	6.6	9.6	20.8	27.1	31.7	34.0	41.7	47.1	47.3	265
30.0	139	2.8	225			4.1	7.0	11.5	23.3	30.0	35.5	39.4	43.4	44.6	49.4	245
31.0	140	2.2	262		3.4	5.1	7.0	14.0	24.1	32.0	40.0	44.4	46.4	44.0	49.2	265
32.0	141	0.5	270			4.1	6.3	13.4	24.0	37.1	42.7	45.0	52.4	53.2	53.3	247
33.0	141	2.8	298			3.6	7.3	14.4	29.2	40.1	51.0	54.0	58.4	66.6	66.7	246
34.0	141	0.2	283		0.4	6.2	8.4	18.1	29.2	44.3	56.0	61.4	62.4	67.2	67.5	258
35.0	141	3.6	294			4.4	9.0	17.2	27.7	47.3	61.0	63.4	64.4	64.7	64.9	241
36.0	141	0.0	0		3.2	7.1	11.0	16.7	29.2	44.3	62.0	64.4	67.4	74.0	74.2	255
37.0	141	0.0	4		0.4	7.1	9.0	20.1	31.3	52.4	64.0	64.4	71.4	72.6	72.7	247
38.0	141	3.0	360		3.2	10.1	12.0	20.2	34.5	55.4	64.0	73.4	75.4	80.0	81.1	279
39.0	142	4.7	6		7.4	9.6	11.6	23.3	34.5	56.5	71.0	74.0	75.4	80.0	80.2	279
40.0	142	4.9	352		6.2	7.2	11.1	23.4	39.0	57.7	70.0	76.0	79.3	79.4	80.0	240
41.0	142	3.6	325			5.2	10.1	23.5	41.6	60.9	69.3	77.4	79.4	80.9	81.1	276
42.0	140	3.8	152			8.2	11.5	21.7	34.4	63.4	67.4	75.4	81.3	81.4	81.9	267
43.0	139	6.3	251		6.4	10.1	11.7	21.0	37.0	62.4	64.1	74.4	80.6	85.1	85.3	269
44.0	140	4.0	270		6.4	8.4	11.0	17.2	36.7	64.3	71.5	77.4	79.4	89.4	89.5	275
45.0	138	1.0	360		5.4	6.4	8.6	16.3	34.0	67.1	74.7	74.0	81.4	90.4	90.4	240
46.0	137	0.5	124		1.4	6.4	4.2	14.4	35.2	71.3	74.2	81.7	82.6	91.0	91.3	240
47.0	134	4.0	153		5.2	7.0	7.8	14.0	34.5	71.7	84.0	84.0	86.4	92.1	92.4	270
48.0	136	2.2	333		4.4	6.1	7.0	13.4	36.5	74.4	84.2	84.4	91.4	93.4	93.4	243
49.0	130	1.4	315		1.4	3.0	6.5	12.4	32.0	75.4	87.4	89.0	92.7	94.7	94.0	257
50.0	127	1.0	350		1.3	3.0	7.4	11.7	31.2	76.4	84.7	92.1	92.4	94.1	94.3	241
51.0	122	3.7	210			5.3	7.1	12.4	30.0	77.4	91.0	93.2	95.4	103.4	104.1	243
52.0	115	4.8	192			5.3	7.4	14.4	31.6	74.4	92.3	97.4	106.0	107.4	107.9	258
53.0	110	2.2	153		4.0	4.5	5.4	15.7	20.5	75.4	90.4	100.4	104.0	122.7	122.4	258
54.0	102	1.4	315		2.0	4.3	7.1	14.4	32.0	77.4	94.4	103.7	105.0	132.7	132.9	250
55.0	92	3.2	252			6.0	4.4	13.4	36.0	80.4	94.4	104.0	120.1	121.0	121.1	242
56.0	81	4.0	270			5.4	7.5	13.4	34.4	84.1	100.0	114.2	136.1	137.2	137.4	245
57.0	67	4.0	360			4.5	5.7	16.2	34.4	85.1	101.7	107.4	114.4	115.2	115.4	243
58.0	51	6.2	179				7.6	17.0	32.4	76.9	94.4	104.4	110.4	111.2	111.3	246
59.0	34	4.0	174				9.0	15.6	34.3	75.4	90.1	130.1	130.7	131.1	131.2	244
60.0	22	4.1	386			16.1		20.4	34.0	62.5	102.2	144.4	144.0	149.2	149.2	253
61.0	15	13.9	291					20.4	34.5	92.6	120.2	120.4	120.7	120.4	120.4	244
62.0	8	22.0	177					31.3	47.0	74.7	133.6	133.0	134.0	134.1	134.1	244
63.0	2	71.2	272						71.0	81.0	84.1	84.2	84.2	84.3	84.3	243
64.0	1	84.2	276												84.2	275

SCALAR WIND

TABLE 1.13

DATA SOURCE										ANNUAL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.000	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	8766	+0.0						+1.2	+2.9	+5.3	+7.5	+8.6	+9.8	+12.7	+18.0	30
1.0	8766	+0.0			+0.1	+0.6	+1.2	+2.6	+5.8	+10.4	+15.0	+18.0	+20.9	+26.3	+33.0	
2.0	8766	+0.0			+0.1	+0.5	+1.1	+2.5	+5.8	+11.6	+17.9	+21.6	+25.1	+31.0	+37.0	238
3.0	8766	+0.0			+0.1	+0.5	+1.2	+2.6	+6.5	+14.3	+21.5	+25.8	+29.2	+38.0	+50.0	276
4.0	8766	+0.0			+0.2	+0.6	+1.3	+2.9	+7.6	+17.4	+25.5	+29.7	+34.3	+44.0	+55.0	270
5.0	8766	+0.0			+0.3	+0.9	+1.5	+3.3	+8.8	+21.0	+29.7	+34.8	+39.9	+49.1	+64.0	270
6.0	8766	+0.0			+0.4	+1.1	+1.7	+3.7	+10.3	+24.7	+34.4	+39.6	+44.4	+53.3	+70.0	270
7.0	8766	+0.0			+0.5	+1.2	+2.0	+4.2	+12.3	+28.3	+39.3	+45.2	+51.2	+63.3	+82.0	270
8.0	8766	+0.0			+0.7	+1.3	+2.2	+4.7	+14.4	+32.3	+44.2	+50.4	+57.2	+70.1	+91.0	270
9.0	8766	+0.0		+0.0	+1.0	+1.6	+2.6	+5.6	+16.8	+37.0	+49.3	+57.3	+63.8	+81.0	+97.0	260
10.0	8766	+0.0		+0.1	+1.1	+2.0	+3.1	+6.6	+19.4	+41.3	+54.8	+62.4	+69.7	+82.7	+110.0	270
11.0	8766	+0.0		+0.0	+1.3	+2.3	+3.8	+7.8	+22.1	+45.2	+59.4	+67.0	+75.2	+90.1	+103.0	230
12.0	8766	+0.0		+0.1	+1.6	+2.8	+4.4	+8.8	+24.7	+47.7	+61.3	+69.2	+76.9	+94.7	+104.0	245
13.0	8766	+0.0		+0.1	+1.9	+3.2	+5.0	+9.9	+25.8	+47.1	+60.0	+68.7	+75.1	+98.0	+99.0	260
14.0	8766	+0.0		+0.1	+1.7	+2.9	+4.6	+9.1	+24.3	+43.3	+55.4	+61.7	+68.4	+81.0	+89.0	272
15.0	8766	+0.0		+0.1	+1.4	+2.3	+3.5	+7.3	+20.8	+37.9	+47.6	+54.3	+59.7	+71.1	+80.0	250
16.0	8766	+0.0		+0.0	+1.0	+1.7	+2.8	+5.6	+16.1	+32.1	+41.0	+45.9	+50.6	+60.1	+69.0	
17.0	8766	+0.0		+0.0	+0.8	+1.4	+2.3	+4.7	+12.0	+26.0	+34.1	+38.6	+43.1	+53.4	+62.0	255
18.0	8766	+0.0			+0.6	+1.2	+2.1	+4.2	+9.5	+19.4	+26.7	+31.3	+35.1	+42.7	+57.0	270
19.0	8766	+0.0			+0.5	+1.1	+1.8	+3.6	+8.2	+14.0	+20.0	+24.8	+29.2	+37.2	+51.0	
20.0	8766	+0.0			+0.3	+0.9	+1.4	+3.1	+7.3	+13.4	+17.6	+20.5	+23.9	+31.8	+42.0	
21.0	8766	+0.0			+0.3	+0.8	+1.3	+2.9	+7.2	+13.8	+17.7	+20.0	+22.3	+30.2	+38.0	80
22.0	8766	+0.0			+0.2	+0.8	+1.4	+3.0	+7.6	+14.8	+18.8	+20.7	+22.8	+31.5	+47.0	265
23.0	8766	+0.0			+0.2	+0.8	+1.4	+3.2	+8.0	+15.8	+19.9	+21.7	+23.7	+32.0	+41.0	105
24.0	8766	+0.0			+0.3	+1.0	+1.6	+3.4	+8.8	+16.9	+20.9	+22.8	+25.2	+32.2	+42.0	250
25.0	8766	+0.0		+0.0	+0.4	+1.0	+1.7	+3.6	+9.6	+18.0	+22.2	+24.7	+27.0	+35.0	+42.0	
26.0	8766	+0.0			+0.5	+1.1	+1.8	+3.9	+10.3	+19.1	+23.6	+26.4	+29.5	+36.6	+51.0	264
27.0	8766	+0.0			+0.6	+1.2	+2.0	+4.2	+11.1	+20.2	+25.0	+27.8	+31.3	+40.0	+53.0	263
28.0	1199	0.3	4	0.3	0.4	1.0	2.0	5.0	12.5	20.0	25.0	27.4	30.0	35.4	36.4	254
29.0	1224	0.1	217	0.2	0.7	1.7	2.8	6.7	13.5	21.0	27.4	29.7	31.6	41.3	47.3	254
30.0	1246	0.0	0	0.1	1.3	2.1	3.2	6.3	14.4	24.4	29.7	33.7	35.0	43.3	49.4	265
31.0	1262	0.0	0		1.3	2.1	3.5	6.7	15.4	26.3	32.0	36.0	39.3	44.3	49.2	265
32.0	1278	0.0	0		0.7	2.3	3.8	6.9	16.6	28.2	35.1	39.4	42.7	50.2	53.3	267
33.0	1299	0.0	0		1.2	2.2	3.6	6.9	17.3	29.4	37.0	41.0	47.0	58.2	66.7	265
34.0	1314	0.0	0		1.0	2.0	3.4	7.0	18.6	30.4	40.2	46.0	50.0	52.6	67.5	258
35.0	1330	0.0	0		1.1	2.2	3.9	7.4	19.4	32.3	42.2	49.4	54.0	64.1	68.9	261
36.0	1333	0.0	0		1.2	2.6	4.1	7.8	19.4	32.4	43.0	52.2	58.4	64.2	74.2	255
37.0	1339	0.0	0		1.4	2.5	4.3	8.0	20.6	33.5	46.1	54.3	61.0	72.2	75.4	00
38.0	1346	0.0	0	0.2	2.1	3.2	4.0	8.6	21.4	36.2	47.0	56.2	66.2	80.2	82.4	07
39.0	1355	0.0	0	0.1	1.4	3.0	4.9	9.2	22.7	34.1	50.1	57.4	69.5	76.2	80.2	279
40.0	1357	0.0	0	0.2	2.4	3.5	4.9	9.7	24.0	39.3	51.7	60.4	68.4	79.6	85.0	184
41.0	1357	0.0	0	0.2	2.7	3.6	5.2	10.0	25.3	41.4	54.0	62.7	66.7	80.2	89.3	184
42.0	1349	0.0	0	0.3	2.3	3.5	5.3	10.5	26.5	41.5	56.6	64.0	67.4	81.6	85.7	185
43.0	1338	0.0	0		2.5	3.7	5.6	11.3	27.5	43.8	59.4	65.0	70.4	84.2	98.4	104
44.0	1322	0.0	0		2.3	3.7	5.6	11.8	28.4	46.7	61.7	69.7	74.3	89.2	95.0	03
45.0	1305	0.0	0	0.2	3.1	4.2	5.5	11.5	29.2	49.4	65.4	72.4	78.5	94.1	94.9	261
46.0	1287	0.5	126		2.6	4.0	6.3	12.4	30.2	50.4	67.4	77.0	81.7	99.3	103.4	260
47.0	1261	0.0	0	0.7	3.1	4.4	7.1	12.8	30.9	52.7	72.5	86.1	102.3	106.1	261	261
48.0	1234	1.0	180		3.0	4.3	6.8	13.2	32.1	53.3	75.0	84.3	91.3	102.3	105.1	262
49.0	1214	0.0	0	0.2	2.4	4.3	6.8	13.3	33.3	54.6	75.2	87.4	93.5	105.4	108.1	239
50.0	1174	0.2	11	0.3	3.2	4.5	6.7	13.6	34.7	56.4	78.0	89.7	95.4	105.4	117.6	252
51.0	1131	0.9	25		3.2	4.4	6.5	13.7	34.1	54.4	77.0	88.4	97.4	105.6	112.7	246
52.0	1071	1.0			2.7	4.1	6.4	14.1	34.0	54.2	79.2	89.0	99.3	107.4	113.1	248
53.0	1011	1.0			2.3	4.4	7.0	14.3	35.7	53.3	79.6	89.0	100.0	113.6	122.8	258
54.0	924	0.9	51		4.1	5.4	7.6	14.4	36.6	50.4	80.7	89.6	103.4	118.7	132.9	260
55.0	840	1.0	232	1.1	3.9	5.5	8.1	14.5	37.2	60.3	82.4	90.4	100.4	113.9	121.1	262
56.0	743	1.8	58		4.1	5.2	7.4	14.6	37.3	60.4	82.0	95.0	103.4	119.0	137.4	255
57.0	540	0.0	0		3.4	4.7	7.0	14.9	39.5	63.5	85.3	99.4	107.4	121.1	121.9	247
58.0	515	3.8	222		4.0	5.0	8.0	15.0	39.0	63.0	82.3	96.7	105.0	140.2	140.6	259
59.0	393	3.6	146		6.3	7.2	9.5	15.1	37.5	65.3	85.7	98.1	107.5	130.6	131.2	254
60.0	273	4.1	346		4.4	7.6	10.2	15.3	41.2	67.7	89.2	102.3	112.3	144.4	149.2	253
61.0	188	0.3	62		5.0	7.3	8.9	15.2	45.0	72.7	89.6	101.7	119.1	120.6	120.8	244
62.0	129	3.6	124		7.1	7.0	10.4	19.3	46.5	76.7	93.4	97.2	124.4	133.9	134.1	244
63.0	74	8.9	63				10.8	19.1	47.5	83.0	97.1	98.3	111.3	112.1	112.2	242
64.0	49	5.9	329				6.5	17.0	40.5	81.2	89.4	91.0	134.3	134.5	134.5	245
65.0	34	2.8	98				10.9	17.0	47.0	68.0	80.1	82.1	82.4	83.0	83.0	248
66.0	29	3.3	129				9.5	15.4	44.5	61.4	71.6	81.3	81.6	81.4	81.9	03
67.0	25	4.6	46				9.3	17.0	38.5	63.0	114.0	114.0	114.0	114.0	114.0	73
68.0	20	4.4	1				4.5	16.3	37.5	112.4	125.4	129.3	124.6	124.4	124.4	249
69.0	26	4.1	104				7.3	14.1	24.0	71.0	116.7	123.4	123.4	124.0	124.1	248
70.0	25	1.9	292				4.3	14.0	36.5	80.0	127.4	130.4	130.7	131.0	131.0	244

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.1

DATA SOURCE											JANUARY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)	
5FC	744	-11.0	-9.9	-7.7	-6.6	-5.4	-3.1	-0.8	+1.6	+3.7	+4.8	+5.7	+8.9	+10.0		
100	744	-17.0	-15.9	-11.5	-9.9	-7.5	-3.9	+0.6	+7.8	+12.4	+16.0	+19.8	+25.9	+27.0		
200	744	-21.0	-20.9	-10.5	-7.5	-5.8	-1.4	+3.1	+10.2	+16.4	+20.0	+22.3	+26.9	+29.0		
300	744	-22.0	-20.9	-10.1	-6.0	-3.9	-0.6	+5.1	+13.0	+19.8	+23.8	+26.8	+31.9	+39.0		
400	744	-23.0	-19.9	-8.9	-5.6	-3.1	-0.0	+6.9	+16.2	+22.9	+27.8	+30.8	+40.9	+42.0		
500	744	-24.0	-20.9	-9.5	-6.0	-2.9	+1.1	+9.3	+18.8	+25.9	+32.6	+36.1	+43.9	+46.0		
600	744	-25.0	-18.9	-9.7	-6.3	-2.7	+2.5	+11.9	+22.2	+30.6	+35.5	+40.5	+45.9	+54.0		
700	744	-20.0	-16.9	-11.1	-6.0	-2.5	+3.4	+13.9	+25.7	+35.9	+43.0	+46.5	+50.9	+56.0		
800	744	-16.0	-12.2	-7.7	-2.7	+0.7	+5.7	+15.9	+29.1	+39.7	+47.5	+53.1	+61.9	+65.0		
900	744	-19.0	-13.5	-8.8	-2.9	+5.5	+18.4	+32.1	+44.1	+51.0	+56.5	+64.9	+67.0			
1000	744	-29.0	-25.9	-9.5	-3.2	+6.5	+20.8	+35.7	+47.4	+53.5	+63.1	+69.9	+75.0			
1100	744	-22.0	-21.9	-13.7	-9.6	-2.4	+6.9	+23.0	+38.8	+50.4	+58.0	+64.5	+75.9	+87.0		
1200	744	-27.0	-24.9	-13.5	-7.0	-1.9	+8.4	+24.3	+40.6	+51.4	+57.6	+67.2	+73.9	+75.0		
1300	744	-20.0	-15.9	-8.7	-3.0	+1.7	+10.6	+23.8	+36.3	+47.3	+52.8	+66.7	+70.9	+72.0		
1400	744	-11.0	-8.9	-5.2	-0.7	+2.3	+10.5	+22.1	+35.3	+44.1	+49.0	+53.8	+60.9	+62.0		
1500	744	-9.0	-1.9	-0.6	+1.7	+9.2	+20.2	+31.5	+39.7	+43.2	+47.5	+55.9	+61.0			
1600	744	-10.0	-9.9	-3.8	-0.8	+1.5	+7.8	+17.6	+27.0	+33.3	+36.2	+39.2	+43.4	+44.0		
1700	744	-8.0	-6.1	-2.8	-0.0	+5.2	+13.8	+21.9	+28.4	+32.0	+33.8	+40.9	+44.0			
1800	744	-13.0	-8.9	-5.6	-4.1	-0.8	+3.2	+9.6	+17.1	+23.0	+26.1	+27.5	+31.9	+33.0		
1900	744	-8.0	-7.9	-5.3	-3.9	-1.7	+0.9	+6.2	+11.9	+17.9	+21.1	+25.5	+29.9	+36.0		
2000	744	-12.0	-10.9	-5.9	-5.1	-3.7	-0.6	+3.7	+8.9	+13.8	+16.5	+18.5	+23.9	+26.0		
2100	744	-17.0	-15.9	-8.8	-6.3	-4.8	-1.4	+2.3	+7.0	+11.2	+13.8	+16.1	+22.4	+23.0		
2200	744	-17.0	-12.9	-11.1	-8.0	-5.2	-1.9	+1.8	+6.7	+11.4	+14.4	+18.5	+25.9	+28.0		
2300	744	-19.0	-15.9	-11.2	-7.7	-6.1	-2.5	+1.5	+6.8	+11.6	+16.3	+20.1	+28.9	+32.0		
2400	744	-19.0	-16.9	-12.5	-10.0	-6.6	-2.6	+2.0	+7.4	+12.6	+15.7	+18.7	+25.9	+27.0		
2500	744	-15.0	-14.9	-11.3	-9.5	-6.7	-2.6	+2.6	+8.8	+13.5	+17.0	+20.6	+28.4	+29.0		
2600	744	-17.0	-16.9	-13.2	-10.2	-7.0	-2.7	+3.2	+10.6	+16.9	+20.5	+24.2	+29.9	+38.0		
2700	744	-18.0	-15.9	-12.5	-11.0	-8.0	-2.5	+3.8	+12.1	+20.1	+23.6	+29.1	+34.4	+35.0		
2800	105	-11.1	-9.0	-5.4	-2.0	0.0	4.0	14.3	21.4	23.4	24.0	25.1	25.2			
2900	107	-11.0	-10.0	-9.4	-2.7	0.7	6.0	16.4	21.4	22.0	24.0	26.0	26.2			
3000	108	-15.2	-11.0	-10.5	-5.6	2.0	10.4	20.0	23.5	26.5	27.0	29.5	29.6			
3100	109	-14.9	-11.0	-10.5	-4.8	2.6	11.8	21.0	26.4	30.2	30.7	31.1	31.1			
3200	111	-21.4	-15.0	-14.4	-0.4	2.0	12.4	20.0	27.2	30.8	34.4	34.7	39.4			
3300	115	-29.5	-28.4	-20.4	-12.2	1.1	13.4	20.0	30.3	34.2	34.2	39.4	39.1	39.4		
3400	117	-31.7	-30.4	-21.4	-15.1	-0.1	12.4	22.4	29.2	37.4	37.4	39.1	39.4			
3500	116	-31.5	-27.0	-18.2	-10.6	-0.6	11.7	21.4	29.2	37.4	37.4	40.2	40.4			
3600	116	-35.4	-29.4	-26.4	-16.4	-1.0	12.4	21.4	29.4	37.4	37.4	40.2	40.4			
3700	114	-39.4	-27.0	-21.1	-10.1	0.1	12.4	23.4	30.2	37.4	37.4	41.0	42.4			
3800	115	-37.0	-20.4	-22.2	-1.4	11.4	24.4	25.0	30.3	34.0	43.0	44.4	44.7			
3900	117	-34.2	-25.4	-20.6	-2.1	12.4	27.4	34.2	39.4	39.4	44.4	45.0	46.2			
4000	115	-30.9	-30.4	-24.4	-13.2	0.1	11.4	26.4	35.4	41.4	45.0	46.4	48.0			
4100	117	-41.1	-31.0	-31.2	-23.1	-0.7	11.4	26.4	35.4	41.4	47.2	47.2	49.0			
4200	114	-44.2	-31.0	-30.4	-14.3	0.0	13.0	24.4	39.4	47.2	47.2	47.2	49.0			
4300	113	-34.5	-33.0	-30.4	-14.3	-1.4	14.4	30.0	47.2	48.2	49.0	52.0	52.4			
4400	113	-34.9	-34.4	-34.2	-10.3	-1.0	16.0	30.5	44.4	51.4	52.0	59.2	59.4			
4500	111	-40.7	-38.0	-35.5	-10.4	-0.4	17.9	32.5	43.5	53.2	53.0	64.6	64.7			
4600	110	-39.8	-37.0	-36.5	-10.7	0.5	20.1	34.7	46.5	49.7	54.2	69.7	69.4			
4700	106	-40.1	-36.0	-35.4	-11.7	0.4	19.0	39.4	51.4	56.4	57.0	74.1	74.3			
4800	104	-40.4	-36.0	-32.6	-12.8	1.8	22.7	39.4	55.4	56.4	59.0	78.4	78.7			
4900	100	-46.3	-44.0	-25.7	-18.0	1.4	26.0	40.4	64.0	61.7	64.0	79.2	79.4			
5000	100	-54.1	-44.0	-22.7	-19.0	-0.1	27.0	40.1	62.0	61.7	64.0	76.1	76.3			
5100	95	-57.2	-19.0	-18.4	-3.0	26.4	41.7	49.4	69.4	69.4	69.0	69.0	69.4			
5200	88	-57.5	-23.0	-15.4	-4.0	24.3	41.4	50.4	60.0	66.1	66.1	66.4	66.9			
5300	83	-57.9	-20.1	-11.4	-2.6	27.2	41.4	50.4	62.0	65.1	65.1	65.4	65.9			
5400	72	-30.5	-19.4	-6.7	-4.7	29.0	44.4	62.4	65.4	67.1	67.1	67.5	67.5			
5500	64	-25.2	-18.5	-5.4	-3.2	30.0	44.4	62.4	65.4	67.1	67.1	67.5	67.5			
5600	57	-25.9	-18.7	-12.1	-8.0	30.5	49.0	62.2	63.7	78.4	78.4	78.4	78.4			
5700	46	-20.8	-7.7	-5.4	-3.0	35.0	59.4	62.2	63.7	78.4	78.4	78.4	78.4			
5800	26	-24.2	-13.7	-3.5	-3.0	31.0	57.2	67.2	67.2	78.4	78.4	78.4	78.4			
5900	14	-21.1														
6000	10	-19.5														
6100	7	-15.8														
6200	6	10.9														
6300	5	10.6														
6400	4	5.0														
6500	3	12.3														
6600	3	-0.4														
6700	3	4.1														
6800	4	4.6														
6900	4	7.5														
7000	4	12.6														

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.2

DATA SOURCE										FEBRUARY							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	CUMULATIVE		PERCENTAGE	FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	678	11.0			-7.4	-6.1		-5.0	-2.9	-0.4	+2.3	+4.5	+5.8	+7.4	+11.0	+12.0	
1.0	678	15.0			-10.0	-8.4		-5.9	-2.2	+2.3	+8.7	+14.7	+18.4	+20.8	+27.0	+28.0	
2.0	678	13.0			-9.2	-6.9		-4.5	-0.6	+4.0	+11.0	+17.3	+21.1	+25.0	+28.0	+29.0	
3.0	678	14.0			-8.6	-5.7	-3.0	+0.0	+6.3	+14.2	+21.3	+23.6	+27.1	+34.5	+35.0		
4.0	678	12.0			-10.0	-5.5	-2.1	+1.3	+8.1	+17.3	+24.3	+27.3	+30.4	+41.0	+42.0		
5.0	678	15.0			-8.6	-5.1	-1.7	+1.0	+10.3	+20.4	+27.7	+33.1	+36.6	+41.0	+42.0		
6.0	678	18.0			-10.1	-5.5	-1.4	+3.4	+13.0	+24.0	+32.5	+36.8	+41.1	+48.0	+49.0		
7.0	678	17.0			-8.7	-5.5	-1.0	+4.1	+15.1	+27.5	+37.0	+42.7	+48.0	+55.0	+56.0		
8.0	678	18.0			-11.2	-6.0	-0.9	+4.6	+16.8	+31.2	+42.0	+46.3	+50.4	+67.0	+68.0		
9.0	678	24.0			-12.6	-8.5	-1.4	+5.3	+18.8	+35.8	+45.4	+52.5	+57.2	+62.0	+63.0		
10.0	678	30.0			-15.8	-10.3	-4.5	+5.9	+20.8	+38.6	+48.1	+53.5	+60.6	+71.0	+72.0		
11.0	678	47.0			-15.6	-9.9	-4.0	+5.7	+22.2	+41.0	+53.2	+58.5	+63.7	+85.0	+86.0		
12.0	678	39.0			-13.2	-7.5	-1.5	+7.5	+24.7	+42.7	+52.7	+59.7	+66.1	+81.0	+82.0		
13.0	678	28.0			-10.2	-3.8	-0.0	+9.0	+23.8	+41.2	+52.8	+58.5	+63.2	+74.0	+75.0		
14.0	678	25.0			-9.2	-3.1	+1.4	+9.2	+22.2	+36.6	+45.6	+51.8	+57.2	+65.0	+66.0		
15.0	678	27.0			-5.1	-0.5	+2.3	+8.1	+19.8	+31.9	+38.6	+43.0	+45.7	+51.0	+52.0		
16.0	678	22.0			-6.1	-1.2	+1.9	+7.4	+16.6	+27.5	+33.0	+35.8	+39.2	+44.6	+45.0		
17.0	678	25.0			-5.2	-1.1	+0.8	+5.2	+12.9	+21.5	+27.5	+31.6	+32.9	+42.0	+43.0		
18.0	678	18.0			-9.2	-3.2	-0.7	+2.5	+8.8	+17.2	+22.0	+26.5	+30.0	+33.0	+34.0		
19.0	678	14.0			-9.2	-3.8	-1.6	+0.2	+5.2	+12.1	+18.5	+20.8	+23.7	+35.0	+36.0		
20.0	678	12.0			-8.1	-6.1	-3.8	-1.2	+2.6	+8.7	+13.6	+16.8	+17.6	+31.0	+32.0		
21.0	678	19.0			-11.6	-9.5	-6.5	-2.7	+0.6	+6.0	+10.5	+13.9	+17.0	+26.0	+27.0		
22.0	678	27.0			-13.1	-10.1	-7.1	-3.4	+0.1	+4.7	+8.5	+10.8	+13.4	+23.5	+24.0		
23.0	678	20.0			-12.7	-9.3	-7.5	-3.9	+0.2	+4.4	+8.5	+10.9	+14.8	+19.0	+20.0		
24.0	678	14.0			-12.3	-9.9	-7.8	-4.0	+0.0	+4.4	+8.4	+10.5	+12.3	+19.0	+20.0		
25.0	678	17.0			-14.1	-11.7	-8.5	+4.3	+0.0	+5.1	+8.2	+10.2	+12.1	+17.0	+18.0		
26.0	678	23.0			-12.6	-10.6	-8.8	-4.4	+0.2	+5.4	+9.1	+12.0	+13.7	+19.0	+20.0		
27.0	678	27.0			-13.1	-10.7	-8.8	-3.9	+0.4	+5.8	+10.4	+12.2	+15.7	+20.0	+21.0		
28.0	82	-7.5				-7.4	-6.0	-1.2	+3.3	+10.0	+13.5	+15.1	+18.2	+19.0	+19.2		
29.0	82	-0.4				-7.4	-1.3	+0.0	+1.0	+15.0	+16.1	+17.2	+18.1	+18.2	+18.2		
30.0	81	-10.9				-8.0	-0.0	+0.0	+7.1	+14.7	+17.0	+19.2	+20.2	+20.7	+20.4		
31.0	81	-9.8				-6.0	+1.0	+1.0	+10.2	+17.2	+22.0	+23.0	+23.4	+24.1	+24.1		
32.0	81	-13.1				-10.2	-5.0	+2.5	+13.7	+20.7	+25.0	+31.2	+35.3	+36.2	+36.4		
33.0	84	-13.3				-7.0	-5.5	+0.0	+12.7	+20.5	+25.6	+27.6	+28.1	+28.2	+29.0		
34.0	94	-10.4				-6.0	-5.0	+1.5	+10.7	+17.5	+25.2	+26.0	+30.1	+30.4	+30.9		
35.0	100	-19.0			-10.0	-12.7	-8.5	-1.1	+0.2	+18.5	+26.0	+27.0	+30.0	+31.0	+31.1		
36.0	102	-10.9			-16.0	-15.3	-7.9	-1.5	+10.7	+17.4	+27.0	+30.3	+30.0	+31.3	+31.4		
37.0	105	-10.8			-14.0	-12.6	-8.0	-1.7	+10.1	+14.8	+26.3	+27.6	+29.4	+29.0	+29.9		
38.0	107	-10.2			-17.0	-16.6	-8.3	-1.0	+11.4	+20.3	+27.7	+31.4	+32.0	+33.6	+33.7		
39.0	109	-10.4			-14.0	-17.5	-9.6	+0.1	+11.1	+21.7	+27.0	+29.8	+32.0	+32.0	+33.0		
40.0	109	-10.5			-10.5	-16.5	-8.8	-0.4	+11.0	+21.2	+30.6	+34.5	+34.0	+52.4	+53.0		
41.0	112	-20.2			-15.0	-14.5	-0.4	+1.6	+10.2	+23.0	+32.7	+47.5	+55.2	+60.4	+60.9		
42.0	104	-16.4				-16.5	-7.5	+3.4	+14.4	+25.3	+36.4	+50.9	+51.0	+61.4	+61.6		
43.0	104	-21.7			-16.0	-15.5	-10.6	+3.8	+17.7	+28.0	+39.6	+50.2	+54.2	+64.1	+64.3		
44.0	104	-25.0			-22.0	-18.4	-4.0	+3.7	+18.4	+32.2	+41.7	+63.4	+64.0	+65.0	+66.1		
45.0	104	-23.6			-22.0	-10.6	-2.7	+6.7	+21.2	+35.2	+44.7	+58.6	+71.9	+73.3	+73.5		
46.0	102	-23.5			-16.0	-5.7	-0.9	+10.0	+21.7	+38.0	+44.0	+59.7	+75.0	+79.6	+79.7		
47.0	102	-23.3			-17.0	-2.7	+1.1	+11.5	+22.0	+36.4	+48.0	+61.7	+77.0	+77.8	+77.9		
48.0	94	-25.5				-4.8	+3.5	+13.3	+23.0	+37.7	+47.1	+59.8	+69.6	+70.2	+70.3		
49.0	95	-20.7				-0.8	+4.0	+13.1	+23.5	+40.0	+49.3	+54.0	+63.0	+63.4	+63.9		
50.0	90	-37.5				+3.0	+5.3	+13.1	+23.0	+38.0	+47.3	+51.0	+63.1	+64.2	+64.4		
51.0	83	-43.1				-1.1	+4.6	+12.7	+25.1	+38.2	+48.4	+52.1	+65.1	+65.6	+65.7		
52.0	80	-47.1				-5.2	+7.0	+15.6	+25.3	+39.4	+52.0	+54.9	+65.1	+65.6	+65.7		
53.0	74	-51.0				-10.3	+0.7	+15.7	+27.0	+44.3	+56.3	+60.3	+69.2	+69.2	+69.4		
54.0	64	-52.3				-11.5	+12.3	+17.3	+31.0	+47.5	+54.7	+60.6	+67.2	+67.5	+67.6		
55.0	50	-46.1				+7.4	+10.5	+16.3	+34.3	+51.2	+60.0	+67.4	+70.4	+71.0	+71.1		
56.0	50	-30.9				+6.1	+11.1	+17.5	+34.7	+50.1	+65.5	+75.0	+77.4	+77.8	+77.9		
57.0	45	-47.1				+2.0	+5.3	+19.1	+35.4	+52.0	+64.0	+71.0	+97.3	+97.5	+97.5		
58.0	39	-38.6					-1.0	+22.2	+35.5	+44.3	+67.1	+69.1	+69.7	+69.0	+69.1		
59.0	27	-42.2					+12.4	+25.1	+39.3	+40.7	+54.7	+64.3	+64.5	+64.5	+64.7		
60.0	20	-4.4					-8.0	+30.2	+41.0	+54.8	+55.0	+60.4	+60.4	+61.0	+61.1		
61.0	13	-13.6						+24.1	+52.0	+59.0	+59.2	+60.1	+60.2	+60.3	+60.3		
62.0	7	-20.2						+21.1	+56.3	+57.0	+68.5	+68.0	+68.0	+68.0	+68.0		
63.0	4	-29.1							+40.0	+82.4	+82.3	+83.1	+83.1	+83.2	+83.2		
64.0	2	-41.9							+42.0	+54.9	+59.2	+59.3	+59.3	+59.3	+59.3		
65.0	1	-43.3													+43.3		
66.0	2	-35.9							+36.0	+40.3	+40.5	+40.5	+40.5	+40.5	+40.5		
67.0	1	-71.5													+73.5		
68.0	-3	-43.1							+75.5	+90.4	+100.2	+100.4	+100.4	+100.5	+100.5		
69.0	-3	-36.9							+42.5	+61.5	+62.0	+62.1	+62.1	+62.1	+62.1		
70.0	-4	-36.5							+36.5	+52.5	+52.4	+52.0	+53.0	+53.0	+53.0		

Positive is wind from the tail (210°).

Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.3

DATA SOURCE										MARCH						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-12.0	-10.9	-8.3	-7.1	-5.6	-3.2	-0.4	+2.1	+4.2	+5.6	+6.9	+9.9	+11.0		
1.0	744	-19.0	-15.9	-12.1	-10.1	-6.9	-3.0	+1.9	+7.9	+12.6	+15.5	+18.6	+23.9	+26.0		
2.0	744	-12.0	-11.9	-9.7	-7.2	-4.6	-1.2	+3.1	+10.2	+15.9	+18.1	+20.5	+26.9	+31.0		
3.0	744	-17.0	-13.9	-9.1	-7.0	-3.7	-0.5	+4.6	+12.5	+18.3	+22.4	+25.1	+28.9	+40.0		
4.0	744	-15.0	-12.9	-8.8	-6.2	-3.4	-0.3	+6.2	+14.6	+20.8	+25.2	+30.5	+38.9	+42.0		
5.0	744	-17.0	-13.9	-9.5	-6.3	-2.8	-0.9	+8.1	+16.9	+24.4	+27.0	+37.5	+42.9	+49.0		
6.0	744	-20.0	-16.9	-8.8	-5.0	-2.2	-2.5	+9.8	+20.3	+27.7	+31.2	+38.5	+56.9	+58.0		
7.0	744	-21.0	-20.9	-9.7	-5.6	-1.8	-3.6	+11.8	+23.0	+32.1	+38.9	+42.8	+63.9	+66.0		
8.0	744	-21.0	-20.9	-10.7	-6.0	-0.8	-4.5	+13.9	+25.7	+35.7	+41.0	+47.5	+59.9	+64.0		
9.0	744	-23.0	-20.9	-12.2	-7.6	-1.9	-5.0	+15.3	+29.0	+40.1	+47.0	+55.5	+66.9	+78.0		
10.0	744	-30.0	-28.9	-13.2	-9.0	-2.3	-5.3	+17.8	+32.3	+43.4	+53.0	+60.2	+72.9	+81.0		
11.0	744	-34.0	-30.9	-15.5	-9.0	-1.9	-5.1	+19.1	+34.6	+46.8	+55.0	+67.8	+91.9	+96.0		
12.0	744	-32.0	-26.9	-13.5	-4.3	-0.8	-7.3	+20.8	+35.9	+48.6	+58.5	+68.5	+85.9	+90.0		
13.0	744	-22.0	-21.9	-12.2	-3.5	-2.0	-9.1	+21.3	+34.3	+44.4	+52.0	+64.5	+78.9	+87.0		
14.0	744	-21.0	-16.9	-5.7	-0.6	-3.8	-9.4	+19.6	+30.9	+40.4	+45.6	+48.2	+58.9	+67.0		
15.0	744	-17.0	-16.9	-5.5	-0.7	-3.1	-9.2	+17.5	+27.4	+34.6	+38.7	+44.2	+53.9	+60.0		
16.0	744	-11.0	-16.9	-4.5	-0.8	-2.1	-7.3	+14.9	+22.7	+28.5	+32.0	+37.7	+46.9	+52.0		
17.0	744	-15.0	-8.9	-3.8	-1.5	-0.4	-5.5	+11.8	+19.1	+26.1	+29.2	+33.5	+36.4	+37.0		
18.0	744	-8.0	-7.9	-4.7	-2.0	-0.5	-2.3	+7.9	+14.7	+20.5	+24.0	+28.5	+32.9	+34.0		
19.0	744	-14.0	-12.9	-6.2	-4.1	-2.1	-0.1	+4.2	+10.1	+14.8	+18.5	+21.7	+30.4	+31.0		
20.0	744	-12.0	-11.9	-7.2	-5.6	-3.8	-1.3	+1.8	+6.8	+11.6	+14.5	+17.7	+26.9	+31.0		
21.0	744	-13.0	-9.9	-7.5	-5.8	-5.8	-2.9	+0.3	+4.8	+8.6	+10.3	+12.2	+18.9	+25.0		
22.0	744	-17.0	-16.9	-10.2	-7.8	-6.3	-3.8	-0.1	+3.8	+6.6	+9.2	+13.3	+16.9	+34.0		
23.0	744	-20.0	-16.9	-12.3	-10.1	-6.9	-4.4	-0.6	+2.9	+6.2	+8.4	+11.2	+16.9	+23.0		
24.0	744	-21.0	-18.9	-14.1	-11.2	-7.9	-4.7	-0.7	+2.9	+6.4	+8.6	+10.7	+12.9	+17.0		
25.0	744	-18.0	-16.9	-14.5	-11.6	-8.9	-4.9	-0.5	+3.4	+7.1	+9.1	+11.3	+14.9	+17.0		
26.0	744	-20.0	-19.9	-12.9	-10.3	-7.9	-5.0	-0.4	+3.9	+8.2	+10.1	+13.1	+15.4	+16.0		
27.0	744	-28.0	-23.9	-16.8	-14.0	-9.2	-4.7	-0.2	+4.5	+8.9	+11.2	+12.7	+19.9	+22.0		
28.0	84	-10.8	-7.0	-4.5	-0.0	0.0	4.7	10.2	11.0	14.0	14.0	18.1	18.0	19.0		
29.0	93	-11.8	-4.0	-0.8	0.0	0.0	5.7	11.7	14.0	14.0	15.0	19.1	19.7	19.8		
30.0	97	-10.2	-7.8	-2.5	0.0	0.0	6.6	12.5	14.7	14.7	16.0	17.0	18.0	18.4		
31.0	94	-16.7	-4.0	-4.0	0.0	1.4	7.3	15.1	17.4	17.4	17.0	19.0	19.6	19.7		
32.0	101	-19.3	-9.0	-5.0	-3.0	0.8	6.8	14.0	21.0	22.7	24.0	24.0	25.0	25.0		
33.0	103	-20.8	-8.0	-7.9	-5.0	-0.4	5.0	18.0	20.4	22.7	24.0	25.1	25.3	25.3		
34.0	103	-20.9	-8.0	-6.8	-3.6	0.1	6.8	14.4	20.7	21.4	22.0	22.6	22.7	22.7		
35.0	103	-19.2	-16.0	-10.5	-3.0	0.0	5.0	12.4	17.4	18.4	19.0	25.6	26.7	26.7		
36.0	104	-18.6	-18.5	-10.5	-3.9	-0.6	5.6	13.0	16.5	21.6	21.6	22.9	27.9	28.1		
37.0	113	-20.1	-17.0	-10.4	-4.2	0.0	5.7	13.4	16.0	26.0	26.0	27.5	27.6	27.6		
38.0	113	-21.1	-15.0	-11.7	-7.3	0.2	5.0	13.0	19.7	23.0	26.0	28.6	28.4	28.4		
39.0	114	-24.3	-13.0	-11.4	-7.1	-0.2	6.6	13.5	21.2	25.0	26.0	29.6	29.7	29.7		
40.0	114	-37.3	-11.8	-8.7	-7.1	-0.9	6.0	15.8	21.6	23.0	26.8	37.8	37.9	37.9		
41.0	114	-37.8	-22.8	-11.4	-9.2	0.1	7.4	15.4	19.7	28.7	31.4	42.0	43.0	43.0		
42.0	114	-31.8	-12.0	-11.4	-5.6	-0.1	9.6	17.6	23.0	28.0	29.0	44.0	44.1	44.1		
43.0	114	-28.7	-11.0	-5.4	-1.8	1.7	9.6	10.3	25.3	31.0	36.0	47.0	48.1	48.1		
44.0	114	-24.6	-10.0	-4.4	0.2	3.5	11.4	20.2	28.7	32.0	37.0	44.6	44.7	44.7		
45.0	111	-19.8	-8.0	-3.7	0.1	4.8	12.6	22.5	30.5	35.0	39.0	41.1	41.2	41.2		
46.0	110	-15.1	-7.0	-6.5	-0.5	6.6	13.0	25.2	30.0	36.5	37.0	41.1	41.3	41.3		
47.0	104	-11.0	-8.0	-6.5	1.4	7.5	16.0	25.4	30.0	37.0	38.0	42.0	42.2	42.2		
48.0	107	-10.4	-9.0	-8.6	-0.7	10.0	17.1	26.4	29.0	40.4	41.0	42.5	42.6	42.6		
49.0	105	-11.8	-10.0	-7.5	-0.4	11.3	19.5	28.7	37.4	40.4	41.0	43.4	43.0	43.0		
50.0	102	-17.6	-9.0	-6.9	0.1	11.6	20.3	30.5	39.0	40.0	40.0	44.5	44.5	44.5		
51.0	97	-9.4	-5.0	-5.8	2.0	10.8	20.7	30.4	39.0	43.0	45.0	46.2	46.4	46.4		
52.0	94	-12.7	-3.0	-4.4	0.4	10.6	20.6	30.4	42.0	44.0	46.0	46.5	46.5	46.5		
53.0	87	-16.0	-14.0	-3.2	3.2	9.0	20.8	29.7	39.7	46.0	47.1	47.0	47.0	47.0		
54.0	80	-10.4	-14.2	2.0	2.0	9.7	21.5	31.2	36.3	38.0	45.1	45.5	45.5	45.5		
55.0	60	-22.8	-10.4	-0.6	-0.6	9.0	22.5	30.1	37.4	39.7	40.1	40.4	40.5	40.5		
56.0	50	-6.4	-4.6	6.0	13.5	23.0	29.0	37.0	37.0	41.4	47.6	48.2	48.3	48.3		
57.0	51	-5.1	-9.0	6.3	18.0	25.0	32.0	39.4	49.4	49.4	45.4	46.2	46.3	46.3		
58.0	41	-4.2	-7.5	3.1	17.3	28.3	35.2	40.4	42.1	42.4	43.0	43.1	43.1	43.1		
59.0	39	0.1	-8.6	20.5	29.0	40.0	40.0	40.4	50.0	50.0	51.2	51.3	51.3	51.3		
60.0	22	17.4	19.1	27.4	32.0	50.3	52.6	53.0	53.1	53.1	53.1	53.1	53.1	53.1		
61.0	14	10.7	26.2	32.0	45.8	55.4	56.0	56.2	56.4	56.4	56.4	56.4	56.4	56.4		
62.0	10	19.9	25.5	33.0	44.4	50.7	49.4	50.7	51.1	51.3	51.4	51.4	51.4	51.4		
63.0	7	13.2	23.1	30.6	34.0	40.0	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6		
64.0	6	28.3	36.5	65.1	65.5	65.4	65.4	65.4	65.4	65.4	65.4	65.4	65.4	65.4		
65.0	3	0.4	23.5	31.4	31.5	31.5	31.5	31.5	31.5	31.5	31.7	31.7	31.7	31.7		
66.0	2	-7.7	-3.0	8.8	9.1	9.1	9.1	9.1	9.1	9.1	9.2	9.2	9.2	9.2		
67.0	1	-11.1													-11.1	
68.0	1	-4.8													-3.8	
69.0	1	-9.9													-0.9	
70.0	1	-5.3													-5.3	

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.4

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	720	-10.0			-7.6	-6.6	-5.4	-3.0	-0.5	+1.9	+3.6	+4.9	+6.6	+12.0	+13.0	
1.0	720	-16.0			-10.5	-8.6	-6.9	-3.7	+0.2	+5.2	+10.1	+15.3	+17.6	+20.6	+21.0	
2.0	720	-18.0			-9.9	-8.6	-6.6	-3.5	+0.3	+5.9	+11.2	+17.0	+18.2	+22.0	+23.0	
3.0	720	-21.0			-12.4	-10.3	-7.3	-3.7	+0.7	+7.1	+14.1	+18.3	+20.8	+28.0	+29.0	
4.0	720	-22.0			-13.3	-10.7	-8.2	-3.6	+1.4	+9.3	+16.2	+19.5	+23.4	+33.0	+34.0	
5.0	720	-22.0			-11.5	-9.9	-7.6	-2.9	+2.2	+11.0	+18.7	+23.6	+26.7	+34.5	+35.0	
6.0	720	-27.0			-11.1	-10.0	-7.2	-2.9	+2.9	+13.1	+21.8	+27.1	+31.2	+37.0	+38.0	
7.0	720	-21.0			-11.9	-10.1	-7.6	-3.3	+1.0	+15.2	+24.6	+31.2	+34.9	+40.0	+41.0	
8.0	720	-22.0			-12.9	-10.7	-8.1	-3.3	+5.4	+17.2	+27.2	+33.2	+42.1	+47.0	+48.0	
9.0	720	-23.0			-14.3	-11.7	-9.8	-4.1	+6.3	+20.2	+30.5	+37.6	+44.4	+61.0	+62.0	
10.0	720	-36.0			-18.8	-16.3	-12.0	-4.7	+7.3	+23.3	+35.5	+39.7	+44.9	+60.0	+61.0	
11.0	720	-40.0			-21.8	-17.6	-12.8	-5.7	+7.9	+26.3	+38.0	+43.1	+48.9	+65.0	+66.0	
12.0	720	-45.0			-23.7	-19.5	-13.6	-5.0	+9.0	+29.0	+39.2	+44.5	+54.8	+69.0	+70.0	
13.0	720	-42.0			-24.4	-15.9	-11.5	-3.2	+10.7	+28.8	+38.5	+44.5	+50.9	+58.5	+59.0	
14.0	720	-32.0			-20.7	-16.2	-10.2	-1.7	+10.5	+26.1	+35.6	+39.7	+43.9	+51.0	+52.0	
15.0	720	-19.0			-15.5	-12.1	-7.4	-0.8	+9.8	+22.4	+28.3	+32.5	+37.9	+42.5	+43.0	
16.0	720	-18.0			-12.5	-8.8	-6.0	-0.9	+7.4	+17.9	+23.4	+28.2	+33.4	+39.0	+40.0	
17.0	720	-18.0			-10.7	-8.6	-6.2	-2.4	+5.5	+13.7	+19.7	+24.6	+27.4	+35.0	+36.0	
18.0	720	-21.0			-11.7	-8.8	-6.7	-3.0	+2.6	+9.2	+14.6	+18.5	+21.2	+24.5	+25.0	
19.0	720	-15.0			-10.7	-9.3	-7.2	-3.9	+0.5	+6.0	+11.0	+14.3	+17.9	+32.0	+33.0	
20.0	720	-13.0			-10.8	-9.6	-7.5	-4.6	-0.5	+3.9	+7.7	+11.1	+13.9	+21.0	+22.0	
21.0	720	-13.0			-10.5	-9.2	-7.7	-5.4	-1.1	+2.0	+5.0	+7.2	+8.9	+15.0	+16.0	
22.0	720	-13.0			-9.3	-8.6	-7.6	-5.5	-1.9	+1.1	+3.8	+4.9	+7.9	+12.0	+13.0	
23.0	720	-13.0			-10.9	-9.4	-7.7	-5.5	-2.2	+0.7	+3.0	+4.7	+6.2	+8.0	+9.0	
24.0	720	-15.0			-11.5	-10.2	-7.9	-5.9	-2.3	+1.1	+3.6	+4.8	+6.4	+10.0	+11.0	
25.0	720	-16.0			-12.3	-10.6	-9.0	-6.3	-2.2	+1.3	+4.6	+6.5	+7.6	+10.0	+11.0	
26.0	720	-16.0			-12.6	-11.9	-9.7	-6.1	-1.5	+1.7	+4.9	+7.0	+8.4	+12.5	+13.0	
27.0	720	-15.0			-12.8	-11.5	-9.6	-6.2	-1.0	+2.2	+5.2	+7.4	+9.5	+12.5	+13.0	
28.0	94	-13.5				-10.4	-8.7	-6.6	-1.1	+5.5	+9.4	+12.4	+16.0	+16.5	+16.5	
29.0	94	-9.4				-8.0	-7.4	-6.1	-1.0	+7.4	+11.1	+12.0	+15.0	+15.4	+15.0	
30.0	103	-11.1			-11.0	-8.4	-7.6	-5.4	-1.1	+7.3	+13.0	+13.0	+17.0	+14.2	+14.4	
31.0	107	-13.8			-10.0	-9.3	-6.9	-5.4	-1.5	+10.0	+13.3	+16.1	+17.0	+18.0	+18.2	
32.0	104	-11.2			-10.0	-9.3	-8.2	-6.6	-2.4	+9.3	+13.0	+14.0	+15.7	+16.3	+16.4	
33.0	104	-12.6			-12.6	-9.4	-8.0	-6.0	-2.6	+11.5	+13.7	+15.6	+16.0	+19.2	+19.4	
34.0	104	-14.9			-10.0	-14.3	-10.3	-6.1	-2.2	+10.1	+15.1	+15.0	+20.0	+22.4	+22.6	
35.0	110	-20.5			-15.0	-12.4	-11.7	-8.5	-1.7	+9.4	+15.1	+15.0	+16.4	+16.7	+16.7	
36.0	112	-23.4			-17.0	-14.5	-10.8	-5.1	-2.4	+8.4	+11.4	+13.4	+15.0	+14.8	+14.0	
37.0	112	-24.7			-19.0	-14.7	-11.4	-5.7	-2.4	+9.0	+10.7	+12.5	+13.0	+17.7	+17.9	
38.0	114	-24.4			-16.0	-15.4	-11.3	-7.2	-1.7	+8.5	+12.0	+14.0	+17.6	+14.4	+14.4	
39.0	112	-25.9			-13.0	-12.5	-10.5	-6.6	-1.2	+9.3	+14.7	+16.0	+16.0	+14.7	+14.0	
40.0	112	-25.9			-13.0	-11.7	-10.2	-6.3	-2.3	+10.2	+13.1	+14.4	+15.0	+19.4	+19.4	
41.0	113	-23.3			-12.0	-11.4	-7.0	-5.3	-1.1	+9.3	+16.3	+21.0	+24.4	+25.4	+25.4	
42.0	112	-22.4			-12.0	-11.5	-9.7	-5.4	-2.1	+9.1	+16.4	+20.0	+24.0	+24.1	+24.3	
43.0	112	-21.1				-10.5	-9.6	-6.4	-2.3	+10.0	+17.4	+26.4	+24.0	+31.0	+32.0	
44.0	111	-16.1			-15.0	-14.4	-11.4	-8.1	-2.7	+11.0	+19.4	+27.7	+29.0	+36.4	+36.5	
45.0	110	-13.6			-13.6	-12.8	-9.7	-6.5	-4.0	+13.5	+19.4	+24.4	+32.0	+39.7	+39.4	
46.0	102	-14.3			-13.0	-11.5	-8.4	-5.0	-5.5	+14.4	+26.7	+31.4	+39.0	+42.1	+42.3	
47.0	104	-13.3			-12.0	-10.4	-8.9	-6.1	-5.3	+14.1	+27.4	+35.4	+36.0	+37.0	+38.0	
48.0	103	-14.7			-12.0	-10.4	-8.4	-5.0	-3.7	+14.0	+30.0	+34.4	+34.0	+39.0	+39.1	
49.0	103	-17.4			-15.0	-10.7	-8.7	-3.2	-4.5	+14.5	+24.0	+34.4	+35.0	+37.1	+37.4	
50.0	100	-10.8			-11.0	-8.0	-6.7	-3.6	-4.4	+13.7	+30.4	+32.0	+34.0	+36.7	+36.4	
51.0	100	-10.0			-10.0	-7.0	-7.0	-2.4	-4.7	+15.1	+31.0	+33.4	+34.0	+35.7	+35.9	
52.0	94	-15.3				-8.0	-6.1	-1.2	-6.3	+14.4	+26.4	+31.0	+33.0	+33.4	+33.6	
53.0	92	-13.4				-11.0	-4.4	-2.5	-7.4	+15.4	+27.0	+31.0	+34.1	+34.7	+34.4	
54.0	80	-12.2				-10.2	-6.0	-0.2	-6.5	+17.2	+27.0	+31.2	+34.4	+39.2	+39.3	
55.0	76	-14.2				-10.1	-7.2	-0.2	-7.5	+14.7	+31.4	+34.4	+41.4	+42.1	+42.2	
56.0	63	-12.3				-10.4	-6.4	-1.0	-9.1	+20.0	+31.0	+30.4	+41.4	+42.2	+42.3	
57.0	52	-14.3				-10.4	-6.4	-0.4	-8.0	+21.4	+32.4	+37.0	+39.4	+40.2	+40.3	
58.0	46	-13.3				-13.0	-8.5	-2.0	-7.7	+23.9	+33.7	+44.0	+54.4	+54.6	+54.6	
59.0	34	-17.1					-9.2	-1.4	-9.5	+23.7	+31.4	+44.4	+44.4	+44.4	+44.9	
60.0	24	-16.0					-7.9	-2.0	-11.5	+29.0	+33.4	+46.4	+46.4	+47.1	+47.1	
61.0	14	-14.8						-4.4	-1.0	+22.4	+27.4	+27.0	+24.1	+24.3	+24.4	
62.0	4	-2.9						-1.7	-7.0	+24.7	+41.4	+41.7	+41.4	+41.0	+41.9	
63.0	4	7.1							-17.0	+34.4	+40.4	+40.4	+40.4	+40.4	+40.4	
64.0	4	-21.0							-33.0	+33.0	+33.0	+33.0	+33.0	+33.0	+33.0	
65.0	2	-15.3							-15.0	+1.3	+1.1	+1.1	+1.0	+1.0	+1.0	
66.0	2	-14.9							-12.0	+0.4	+0.5	+0.5	+0.5	+0.5	+0.5	
67.0	2	-4.3							-8.0	+4.4	+4.5	+4.5	+4.5	+4.5	+4.5	
68.0	2	-23.5							-24.0	+11.1	+10.4	+10.7	+10.7	+10.4	+10.6	
69.0	2	-22.4							-22.0	+9.1	+9.4	+9.7	+9.7	+9.7	+9.7	
70.0	2	-27.7							-24.0	+9.3	+9.0	+9.0	+9.0	+9.0	+9.0	

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

DATA SOURCE											MAY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-4.0			-6.9	-6.0	-4.8	-2.9	-0.6	+1.2	+2.8	+3.8	+4.7	+6.9	+10.0	
1.0	744	-15.0			-11.7	-9.1	-7.0	-4.0	-0.2	+4.0	+6.9	+8.5	+10.7	+16.9	+18.0	
2.0	744	-20.0	-17.9		-12.7	-10.6	-8.4	-4.8	-0.5	+4.0	+7.9	+10.0	+14.1	+16.9	+20.0	
3.0	744	-20.0	-18.9		-12.7	-10.2	-7.6	-4.8	-0.4	+4.5	+9.6	+14.0	+17.0	+18.9	+25.0	
4.0	744	-19.0	-16.9		-12.1	-10.1	-7.9	-4.9	-0.2	+5.2	+11.6	+16.2	+18.9	+24.4	+25.0	
5.0	744	-15.0	-14.9		-12.6	-10.2	-8.4	-4.9	+0.0	+6.7	+12.9	+16.0	+21.2	+25.9	+27.0	
6.0	744	-16.0	-14.9		-12.8	-11.0	-9.2	-4.9	+0.5	+8.4	+14.6	+18.2	+22.8	+29.9	+34.0	
7.0	744	-16.0			-14.3	-13.0	-9.9	-4.8	+1.3	+9.7	+15.9	+21.0	+29.2	+36.9	+39.0	
8.0	744	-20.0			-16.7	-14.6	-10.8	-5.1	+2.1	+12.0	+19.8	+22.0	+32.2	+38.9	+41.0	
9.0	744	-23.0			-19.2	-16.0	-12.4	-5.8	+2.6	+13.9	+21.4	+28.0	+33.5	+42.9	+54.0	
10.0	744	-29.0	-22.9		-21.2	-18.3	-13.6	-6.7	+3.3	+16.4	+25.7	+35.0	+39.7	+47.9	+56.0	
11.0	744	-32.0	-31.9		-25.2	-20.0	-15.6	-7.5	+4.3	+19.3	+31.3	+37.6	+43.7	+54.9	+57.0	
12.0	744	-41.0	-36.9		-28.5	-21.0	-16.4	-7.8	+4.8	+20.8	+35.3	+40.0	+47.5	+62.9	+65.0	
13.0	744	-41.0	-38.9		-29.5	-20.6	-17.0	-8.5	+5.0	+21.1	+34.8	+40.2	+43.6	+56.9	+64.0	
14.0	744	-39.0	-30.9		-25.5	-21.0	-13.9	-6.7	+5.3	+19.3	+30.4	+34.8	+38.8	+56.9	+58.0	
15.0	744	-25.0	-24.9		-20.7	-16.0	-12.3	-6.6	+3.3	+15.6	+23.6	+26.6	+30.2	+38.9	+40.0	
16.0	744	-21.0	-20.9		-16.1	-14.1	-10.9	-6.3	+1.7	+11.9	+16.9	+19.0	+23.2	+24.9	+26.0	
17.0	744	-16.0			-13.9	-12.5	-10.6	-6.6	+0.2	+7.4	+11.7	+13.8	+16.1	+18.9	+20.0	
18.0	744	-15.0	-13.9		-11.7	-10.9	-9.4	-6.3	-0.7	+3.9	+7.0	+8.8	+13.1	+16.9	+18.0	
19.0	744	-16.0	-13.9		-11.1	-9.7	-8.2	-5.8	-1.5	+1.6	+4.5	+5.8	+8.1	+10.9	+16.0	
20.0	744	-17.0	-12.9		-10.8	-9.3	-8.1	-6.0	-2.4	+0.2	+2.7	+4.0	+5.5	+7.9	+9.0	
21.0	744	-17.0	-11.9		-9.6	-8.8	-7.8	-6.0	-2.8	-0.2	+1.6	+2.7	+4.2	+5.9	+8.0	
22.0	744	-10.0			-9.9	-9.0	-8.3	-6.5	-3.4	-0.6	+0.7	+2.5	+4.5	+7.9	+12.0	
23.0	744	-12.0	-11.9		-10.3	-9.5	-8.7	-6.7	-3.6	-0.7	+0.6	+1.8	+3.1	+4.9	+15.0	
24.0	744	-14.0			-11.9	-10.6	-9.5	-7.0	-3.9	-0.7	+1.2	+2.5	+3.7	+4.9	+12.0	
25.0	744	-15.0	-14.9		-13.0	-11.2	-9.6	-7.5	-4.2	-0.7	+0.9	+2.9	+4.3	+5.7	+6.0	
26.0	744	-19.0	-17.9		-14.5	-11.8	-9.8	-7.8	-4.1	-0.6	+1.4	+2.8	+3.9	+5.9	+7.0	
27.0	744	-17.0	-15.9		-13.9	-12.6	-10.6	-7.9	-3.9	-0.4	+1.6	+2.6	+3.5	+6.4	+7.0	
28.0	103	-14.5			-14.0	-11.9	-10.6	-6.7	-3.4	2.1	4.2	4.0	6.0	7.0	8.1	
29.0	105	-12.4			-11.0	-11.3	-10.6	-6.0	-2.3	2.7	5.6	6.5	7.0	7.7	7.9	
30.0	105	-13.9			-13.0	-12.3	-10.6	-8.1	-2.1	2.0	7.4	8.0	10.0	15.7	15.4	
31.0	107	-13.4			-13.0	-12.3	-11.2	-8.0	-2.1	3.4	7.3	8.0	9.0	12.0	13.0	
32.0	110	-14.6			-13.0	-13.2	-11.4	-7.8	-1.0	4.2	7.6	8.2	10.0	10.6	10.7	
33.0	112	-14.1			-14.0	-13.6	-12.4	-7.8	-2.0	3.3	8.2	10.7	11.3	10.4	19.5	
34.0	113	-17.1			-16.0	-14.4	-12.2	-7.2	-1.0	2.8	9.1	9.0	11.0	13.6	13.7	
35.0	113	-16.6			-15.0	-14.5	-13.2	-8.7	-2.4	3.4	9.6	11.2	11.0	13.0	13.2	
36.0	113	-14.9			-14.0	-13.5	-12.4	-9.0	-2.0	3.0	8.4	10.2	10.0	14.0	15.1	
37.0	114	-25.1			-16.0	-13.7	-12.1	-7.7	-2.0	1.8	9.2	10.7	12.0	13.6	13.7	
38.0	112	-14.4			-13.0	-12.0	-11.8	-8.3	-1.5	2.0	6.6	9.6	11.0	14.7	14.8	
39.0	112	-16.6			-16.5	-13.7	-11.0	-8.6	-0.0	1.4	4.0	5.7	12.0	23.5	23.6	
40.0	115	-17.5			-14.7	-13.6	-12.0	-9.0	-6.6	-0.3	3.8	5.7	7.8	19.0	20.1	
41.0	116	-20.6			-20.5	-20.2	-14.2	-11.2	-6.1	-0.6	4.1	7.0	8.8	14.0	14.2	
42.0	116	-15.4			-14.0	-14.2	-13.3	-11.4	-6.3	-0.7	4.4	13.8	15.8	19.4	20.0	
43.0	113	-16.6			-16.5	-16.2	-14.2	-11.8	-6.7	-0.4	5.4	16.0	20.0	27.7	27.8	
44.0	112	-23.6			-19.0	-18.5	-16.2	-12.2	-5.2	-0.4	4.2	6.6	10.0	12.4	12.5	
45.0	111	-22.7			-20.0	-17.7	-16.2	-12.7	-5.1	1.1	5.2	6.6	11.0	16.0	16.2	
46.0	104	-25.7			-20.0	-19.7	-19.1	-12.0	-5.0	1.6	6.6	9.4	10.0	11.0	11.1	
47.0	107	-33.0			-22.0	-21.6	-17.9	-11.4	-4.6	2.5	7.4	9.6	11.0	13.7	13.9	
48.0	104	-33.4			-21.8	-20.3	-12.1	-6.3	1.6	6.7	9.6	10.0	16.4	15.6		
49.0	104	-33.8			-23.7	-26.6	-20.4	-15.1	-6.0	0.0	6.3	7.6	9.0	13.1	13.3	
50.0	100	-34.3			-22.7	-20.3	-19.0	-5.7	1.3	6.0	7.0	8.0	10.6	10.7		
51.0	98	-33.3			-24.4	-22.4	-14.7	-5.0	1.7	5.1	6.0	11.0	11.6	11.6		
52.0	95	-32.1			-26.4	-24.4	-16.0	-5.5	0.6	6.6	8.0	12.4	12.7	12.7		
53.0	90	-33.4			-28.0	-23.5	-16.1	-5.0	1.4	7.4	9.0	12.1	12.7	12.8		
54.0	85	-34.8			-31.1	-20.7	-19.1	-6.4	3.3	7.4	9.1	27.1	27.5	27.5		
55.0	74	-47.3			-37.3	-25.3	-15.1	-6.0	3.3	7.2	8.2	8.4	8.9	9.0		
56.0	56	-46.4			-34.5	-23.7	-15.8	-7.0	-0.2	8.7	15.6	14.5	14.3	19.5		
57.0	57	-46.6			-32.7	-30.1	-16.5	-6.4	4.3	11.2	13.7	14.3	19.6	19.7		
58.0	43	-37.6				-31.8	-20.2	-8.6	6.2	15.0	18.0	18.4	19.0	19.1		
59.0	33	-32.4				-27.3	-23.4	-6.3	3.8	12.4	17.2	17.2	17.4	17.9		
60.0	20	-32.1				-32.0	-28.8	-7.0	2.0	23.0	24.4	24.4	24.5	24.6		
61.0	12	-35.5					-29.1	-13.0	13.1	18.6	19.0	19.2	19.4	19.4		
62.0	9	-39.7					-22.6	-14.7	-4.7	-4.1	-4.0	-3.0	-3.0	-3.0		
63.0	2	-20.2					-20.0	-14.4	-14.3	-14.2	-14.2	-14.2	-14.2	-14.2		
64.0	2	-27.1					-27.0	-19.5	-19.5	-19.5	-19.5	-19.5	-19.5	-19.5		
65.0	2	-35.0						-34.0	-19.1	-19.0	-19.0	-19.0	-19.0	-19.0		
66.0	1	-41.2														
67.0	1	-29.6														
68.0	1	-22.4														
69.0	1	-14.9														
70.0	1	-8.7														

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.6

DATA SOURCE										JUNE					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-8.0			-4.3	-4.8	-3.8	-1.9	-0.3	+1.6	+3.3	+4.6	+5.7	+11.0	+12.0
1.0	720	-15.0			-8.5	-6.8	-5.4	-2.8	+0.6	+5.0	+7.7	+11.1	+12.6	+18.5	+19.0
2.0	720	-10.0			-7.6	-6.5	-5.5	-2.6	+0.4	+4.7	+8.1	+11.0	+14.9	+21.0	+22.0
3.0	720	-11.0			-6.9	-6.4	-4.8	-2.5	+0.6	+4.8	+7.8	+10.8	+14.9	+20.0	+21.0
4.0	720	-10.0			-7.4	-6.4	-5.1	-2.3	+0.5	+4.7	+8.2	+11.7	+14.8	+28.0	+29.0
5.0	720	-13.0			-7.7	-6.5	-5.3	-2.6	+0.4	+5.0	+7.9	+11.7	+15.2	+24.0	+25.0
6.0	720	-15.0			-8.3	-7.0	-5.7	-3.5	+0.0	+4.9	+9.3	+12.5	+16.2	+25.0	+26.0
7.0	720	-13.0			-9.8	-8.7	-6.7	-3.9	+0.3	+5.9	+10.3	+14.3	+17.8	+26.0	+27.0
8.0	720	-12.0			-10.9	-9.5	-8.5	-5.1	+0.4	+7.1	+11.6	+15.5	+18.6	+25.0	+26.0
9.0	720	-14.0			-13.9	-11.9	-10.1	-5.9	+0.7	+8.8	+13.8	+17.7	+22.6	+26.0	+27.0
10.0	720	-22.0			-16.5	-14.8	-12.5	-7.1	+0.9	+9.8	+16.6	+22.2	+26.9	+32.0	+33.0
11.0	720	-29.0			-18.9	-17.9	-14.0	-8.6	+0.9	+11.1	+19.8	+24.7	+28.9	+45.0	+46.0
12.0	720	-33.0			-24.3	-20.3	-17.2	-10.3	+0.1	+12.7	+23.2	+29.1	+33.9	+50.0	+51.0
13.0	720	-30.0			-26.6	-22.6	-18.5	-11.6	+0.2	+12.0	+23.3	+31.1	+36.8	+52.0	+53.0
14.0	720	-32.0			-24.3	-21.8	-18.7	-11.2	+0.7	+8.4	+21.0	+25.9	+29.9	+40.0	+41.0
15.0	720	-29.0			-20.9	-18.9	-15.4	-10.7	-2.3	+4.6	+11.3	+16.7	+20.9	+28.5	+29.0
16.0	720	-20.0			-17.3	-14.9	-12.8	-9.2	-3.1	+1.8	+6.0	+11.1	+14.2	+18.5	+19.0
17.0	720	-22.0			-14.1	-13.0	-10.6	-7.9	-3.4	+0.1	+3.0	+5.6	+7.7	+10.6	+11.0
18.0	720	-19.0			-12.4	-11.4	-9.8	-7.5	-4.0	+0.6	+1.0	+2.9	+4.1	+5.0	+6.0
19.0	720	-22.0			-12.3	-10.8	-9.8	-7.6	-4.4	-1.2	+0.0	+0.8	+2.7	+4.5	+5.0
20.0	720	-14.0			-12.8	-11.8	-10.4	-8.4	-5.1	-1.9	+0.4	+0.0	+0.8	+5.0	+6.0
21.0	720	-18.0			-12.7	-11.5	-9.9	-8.4	-5.4	-2.8	-1.0	+0.3	+0.0	+2.0	+3.0
22.0	720	-19.0			-13.7	-12.6	-11.2	-8.9	-6.1	-3.0	-1.1	+0.4	+0.0	+2.0	+3.0
23.0	720	-19.0			-14.1	-12.9	-12.0	-9.7	-6.5	-3.5	-1.6	+0.6	+0.1	+2.0	+3.0
24.0	720	-18.0			-13.9	-13.0	-12.0	-10.1	-6.8	-4.0	-1.8	+0.9	+0.1	+2.0	+3.0
25.0	720	-17.0			-15.3	-14.2	-12.8	-10.6	-7.5	-4.2	-2.2	-1.2	+0.4	+0.6	+1.0
26.0	720	-17.0			-15.8	-14.9	-13.1	-11.1	-7.8	-4.3	-2.1	-1.2	+0.5	+2.0	+3.0
27.0	720	-20.0			-16.6	-15.1	-13.9	-11.4	-8.0	-4.9	-2.2	-1.1	+0.3	+0.6	+1.0
28.0	103	-16.3			-14.0	-14.0	-14.2	-10.6	-7.0	-4.0	-1.7	+0.4	2.0	4.3	4.5
29.0	104	-20.4			-16.0	-14.4	-12.6	-10.4	-7.4	-4.0	-2.2	-1.2	0.0	0.0	1.0
30.0	107	-14.2			-17.0	-15.4	-14.3	-10.4	-7.5	-4.7	-1.5	+0.7	0.0	2.3	2.5
31.0	104	-17.9			-17.0	-15.5	-13.0	-11.0	-7.1	-4.1	-1.1	0.7	1.0	1.5	1.5
32.0	109	-10.6			-17.0	-16.0	-16.3	-13.0	-6.5	-3.5	-0.5	2.0	3.0	4.6	4.7
33.0	109	-14.4				-15.5	-12.1	-7.2	-3.6	0.2	1.6	2.0	4.5	4.6	
34.0	110	-20.5			-14.0	-16.7	-14.5	-12.1	-4.0	-3.3	0.0	1.6	2.0	2.0	3.1
35.0	111	-26.7			-21.0	-20.5	-17.7	-13.2	-8.0	-4.7	-1.5	+0.7	0.7	1.4	1.5
36.0	111	-20.6			-19.0	-18.5	-16.2	-14.6	-10.2	-6.3	-0.4	1.0	1.0	2.7	2.8
37.0	110	-22.4			-21.0	-18.7	-17.6	-14.0	-10.7	-5.4	-2.2	+0.4	3.0	4.0	5.0
38.0	110	-23.6			-21.0	-20.7	-19.4	-15.0	-11.4	-6.7	-3.1	+0.4	0.0	1.3	1.5
39.0	110	-24.3			-23.0	-22.7	-19.6	-17.4	-11.4	-6.7	-3.2	-2.0	0.0	1.7	1.9
40.0	110	-29.1			-24.0	-23.5	-22.5	-17.4	-12.7	-7.2	-3.0	-3.3	+0.0	-1.3	-1.1
41.0	110	-34.2			-31.0	-27.5	-24.5	-21.2	-13.0	-8.4	-4.4	-3.0	-3.1	-2.3	-2.2
42.0	109	-27.3			-27.0	-26.4	-25.5	-20.2	-14.4	-10.3	-6.7	-5.2	-4.1	-3.1	-3.0
43.0	109	-26.4				-25.2	-21.3	-15.4	-10.5	-7.2	-6.2	-5.4	-4.7	-4.5	-4.5
44.0	109	-30.5			-27.0	-26.5	-23.4	-20.0	-14.5	-10.4	-6.4	-4.5	-1.1	2.0	3.0
45.0	109	-30.7			-27.0	-26.4	-24.4	-20.3	-15.7	-9.0	-6.1	-2.6	+0.4	0.3	0.4
46.0	104	-37.2			-29.0	-26.5	-24.4	-21.4	-15.7	-9.4	-4.1	-3.2	-2.4	-2.2	-2.2
47.0	107	-33.0			-32.0	-28.4	-24.4	-20.4	-15.1	-9.5	-4.7	-3.2	0.0	15.2	15.4
48.0	101	-32.8			-32.0	-30.7	-28.5	-21.3	-14.3	-7.1	-3.0	-0.4	0.0	2.2	2.3
49.0	100	-40.5			-49.0	-30.7	-24.0	-21.7	-14.2	-6.4	-1.7	-1.1	0.0	1.4	1.4
50.0	92	-30.3				-29.0	-27.7	-22.0	-12.5	-6.4	-1.3	0.0	4.1	4.6	4.7
51.0	89	-34.1				-33.5	-28.6	-22.0	-13.7	-6.4	-2.1	0.0	3.1	3.5	3.5
52.0	80	-36.4				-32.2	-24.0	-21.4	-14.3	-7.5	-2.5	-1.4	-0.4	-0.1	0.0
53.0	75	-35.4				-31.6	-27.6	-23.7	-15.1	-8.5	-3.0	-2.0	-2.4	-2.3	-2.3
54.0	73	-42.0				-33.3	-31.2	-24.4	-15.0	-9.4	-5.3	-3.4	-3.9	-2.9	-2.4
55.0	70	-46.6				-33.4	-31.7	-25.0	-18.2	-9.7	-4.7	-2.4	1.4	2.3	2.4
56.0	66	-46.7				-36.5	-34.3	-27.4	-14.0	-10.0	-6.1	-3.5	7.4	8.2	8.3
57.0	62	-46.9				-35.4	-32.9	-26.2	-14.3	-8.0	-2.1	-0.2	6.5	7.2	7.4
58.0	52	-47.0				-34.4	-30.4	-20.0	-9.3	-0.6	2.4	28.6	29.1	29.2	
59.0	40	-43.3				-42.0	-32.4	-14.5	-11.3	-6.0	0.1	0.6	1.0	1.1	
60.0	31	-41.9				-39.7	-34.0	-22.4	-11.5	2.5	29.4	29.4	29.4	29.9	
61.0	23	-34.6				-36.0	-34.7	-25.7	-7.4	-5.1	10.6	10.7	10.4	11.0	
62.0	14	-44.1					-26.0	-10.2	-0.4	1.0	1.2	1.4	1.4	1.4	
63.0	6	-70.9					-30.0	+0.0	+0.1	0.2	0.3	0.3	0.3	0.4	
64.0	2	-47.0					-47.0	-20.5	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	
65.0	2	-34.2					-34.0	-34.3	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1	
66.0	1	-44.1												-45.1	
67.0	1	-44.0												-44.0	
68.0	1	-42.9												-42.9	

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.7

DATA SOURCE										JULY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-6.0		-5.9	-3.7	-2.9	-1.9	-0.8	-0.0	+1.9	+2.9	+3.7	+4.6	+5.9	+8.0	
1.0	744	-11.0		-9.9	-5.8	-4.2	-2.6	-0.6	+1.8	+4.8	+7.6	+10.0	+11.9	+23.9	+27.0	
2.0	744	-13.0		-8.9	-5.6	-4.4	-3.2	-1.2	+1.1	+4.9	+7.8	+9.6	+11.8	+21.9	+24.0	
3.0	744	-8.0		-7.9	-6.3	-4.8	-3.7	-1.5	+0.6	+4.9	+7.8	+9.8	+11.5	+18.9	+20.0	
4.0	744	-9.0		-8.9	-7.3	-5.3	-4.0	-1.9	+0.6	+5.2	+7.9	+9.3	+11.1	+17.9	+19.0	
5.0	744	-10.0		-9.9	-7.5	-6.2	-4.8	-2.5	+0.4	+4.5	+7.2	+8.7	+10.9	+14.4	+15.0	
6.0	744	-12.0		-11.9	-9.5	-7.3	-5.6	-3.0	-0.0	+4.1	+7.0	+9.0	+10.3	+15.9	+19.0	
7.0	744	-19.0		-15.9	-9.9	-9.0	-6.8	-3.9	-0.3	+3.7	+6.9	+8.4	+10.1	+12.9	+15.0	
8.0	744	-24.0		-15.9	-12.1	-10.5	-8.4	-5.0	-0.6	+3.8	+6.9	+8.7	+10.8	+15.9	+20.0	
9.0	744	-28.0		-19.9	-15.8	-13.3	-10.7	-6.6	-1.1	+3.6	+8.8	+11.2	+14.7	+19.9	+25.0	
10.0	744	-30.0		-25.9	-20.2	-14.5	-12.3	-8.2	-2.2	+3.8	+10.2	+13.5	+16.6	+21.9	+27.0	
11.0	744	-31.0		-30.9	-21.7	-17.9	-15.1	-10.1	-3.1	+4.1	+10.8	+15.5	+18.5	+22.9	+25.0	
12.0	744	-33.0		-31.9	-24.1	-22.5	-17.5	-11.8	-4.4	+3.8	+10.5	+15.2	+18.5	+23.4	+24.0	
13.0	744	-37.0		-32.9	-27.5	-24.2	-19.5	-13.9	-4.1	+3.0	+9.8	+14.3	+18.1	+23.9	+26.0	
14.0	744	-36.0		-32.9	-23.9	-21.4	-19.4	-13.7	-6.8	+1.3	+6.7	+10.5	+15.7	+21.9	+27.0	
15.0	744	-30.0		-26.9	-22.2	-19.2	-15.9	-12.0	-6.1	+0.3	+4.6	+7.1	+10.1	+13.9	+24.0	
16.0	744	-19.0		-16.8	-14.6	-12.8	-9.7	-5.4	-0.5	+1.9	+3.9	+5.5	+6.9	+8.9	+12.0	
17.0	744	-17.0		-15.9	-13.9	-11.9	-10.9	-8.6	-5.0	+1.3	+0.5	+2.5	+3.5	+7.9	+10.0	
18.0	744	-14.0		-13.9	-12.1	-11.4	-10.1	-8.1	-5.2	-2.1	-0.5	-0.0	+0.7	+2.7	+3.0	
19.0	744	-16.0		-16.9	-12.9	-11.9	-11.1	-8.9	-6.0	-3.1	-1.3	-0.4	-0.0	+1.9	+3.0	
20.0	744	-18.0		-15.9	-13.9	-12.9	-11.9	-10.0	-7.1	-4.4	-2.5	-1.5	-0.7	+0.9	+3.0	
21.0	744	-16.0		-15.9	-14.5	-13.5	-12.4	-10.6	-7.8	-5.2	-3.4	-2.5	-1.9	+1.0	+6.0	
22.0	744	-20.0		-19.9	-15.6	-14.7	-13.1	-11.3	-8.5	-5.6	-3.5	-2.4	-1.4	+0.9	+6.0	
23.0	744	-23.0		-22.9	-16.4	-15.2	-14.1	-12.1	-9.0	-5.8	-4.0	-2.7	-1.6	+0.9	+6.0	
24.0	744	-20.0		-19.9	-16.5	-15.3	-14.4	-12.6	-9.6	-6.6	-4.5	-3.6	-2.7	+0.0	+4.0	
25.0	744	-19.0			-17.7	-16.6	-15.5	-13.4	-10.1	-7.0	-5.2	-4.3	-3.4	+0.0	+4.0	
26.0	744	-23.0		-19.9	-18.1	-17.0	-16.0	-13.8	-10.5	-7.4	-5.3	-4.1	-3.1	+0.9	+7.0	
27.0	744	-25.0		-21.9	-18.8	-18.0	-16.9	-14.6	-10.7	-7.1	-5.1	-3.7	-2.7	+1.0	+0.0	
28.0	105	-20.1			-20.0	-19.3	-17.7	-15.5	-12.0	-8.4	-6.5	-5.4	-4.1	+1.2	+1.0	
29.0	108	-17.4			-19.0	-18.2	-16.7	-15.0	-11.0	-8.1	-6.7	-5.2	-3.1	+2.2	+2.0	
30.0	111	-20.9			-17.4	-16.5	-15.0	-11.2	-7.9	-5.1	-4.1	-3.1	-2.2	+2.2	+2.1	
31.0	112	-20.2			-20.0	-19.5	-18.4	-14.0	-11.2	-7.2	-5.2	-3.3	-2.3	+1.6	+1.5	
32.0	113	-21.6			-19.0	-18.5	-17.4	-15.0	-10.3	-6.7	-4.2	-3.0	-2.5	+2.6	+2.4	
33.0	117	-19.1			-18.7	-17.1	-16.0	-14.0	-10.0	-7.7	-5.4	-3.7	-2.6	+1.4	+1.5	
34.0	121	-26.9			-21.4	-19.7	-18.5	-15.1	-11.5	-7.5	-5.0	-4.0	-2.2	+0.0	+0.3	
35.0	122	-22.5			-22.5	-21.0	-20.0	-17.1	-12.5	-8.5	-6.1	-4.8	-3.0	+1.0	+3.2	
36.0	122	-21.6				-21.4	-20.4	-17.4	-12.5	-8.5	-6.5	-4.8	-3.0	+1.2	+4.0	
37.0	122	-24.2			-24.2	-23.7	-22.6	-19.1	-15.1	-9.1	-7.0	-5.4	-4.2	+0.1	+0.3	
38.0	124	-31.2			-27.2	-26.2	-25.9	-20.3	-14.4	-9.7	-6.5	-4.8	-3.2	+1.6	+1.6	
39.0	125	-24.2			-27.0	-27.1	-24.9	-21.4	-15.4	-9.7	-6.4	-4.1	-3.1	+0.1	+0.0	
40.0	125	-30.9			-24.0	-24.4	-24.4	-21.2	-16.4	-11.1	-8.4	-5.8	-4.3	+0.4	+0.5	
41.0	125	-30.2			-24.0	-24.1	-25.0	-24.8	-19.1	-13.0	-9.4	-6.8	-4.6	+3.0	+3.9	
42.0	124	-30.5			-30.4	-29.2	-27.4	-24.5	-20.4	-14.5	-9.4	-6.8	-4.2	+5.3	+5.1	
43.0	124	-37.0			-31.2	-30.4	-28.0	-26.1	-21.4	-15.7	-10.7	-8.0	-7.2	+1.3	+1.1	
44.0	122	-35.4			-33.0	-33.4	-31.0	-27.5	-21.8	-14.1	-10.0	-7.0	-5.7	+6.7	+6.6	
45.0	121	-35.1				-31.0	-31.0	-27.0	-21.3	-12.0	-10.0	-9.2	-8.2	+6.2	+6.0	
46.0	114	-37.2			-34.0	-34.1	-32.5	-27.4	-19.3	-13.4	-8.2	-5.7	-4.2	+0.0	+0.2	
47.0	114	-35.7			-34.2	-33.3	-32.0	-27.1	-20.0	-13.3	-9.4	-5.7	-4.6	+4.2	+4.1	
48.0	117	-36.2				-34.7	-32.4	-24.4	-19.1	-12.3	-7.6	-5.7	-4.2	+3.5	+3.4	
49.0	115	-39.6			-37.2	-36.4	-33.1	-27.6	-19.3	-11.5	-8.0	-5.4	-4.2	+0.3	+0.5	
50.0	113	-39.1			-36.0	-36.2	-33.3	-26.0	-19.0	-10.7	-7.4	-5.4	-4.0	+2.6	+2.7	
51.0	110	-34.6				-35.5	-32.5	-26.4	-20.0	-13.1	-8.2	-5.2	-4.2	+2.4	+2.7	
52.0	108	-34.9			-40.0	-35.0	-34.4	-29.0	-19.4	-10.7	-6.4	-4.1	-3.0	+7.1	+7.3	
53.0	103	-42.1				-41.7	-35.8	-29.7	-19.8	-10.7	-6.4	-4.1	-3.0	+7.1	+7.3	
54.0	97	-40.5				-37.4	-35.6	-29.3	-20.2	-11.4	-6.3	-4.2	-3.0	+11.0	+12.4	
55.0	84	-39.5				-36.5	-33.6	-29.0	-20.5	-10.4	-6.0	-4.0	-3.0	+12.1	+13.0	
56.0	84	-40.0					-37.4	-30.3	-21.2	-10.2	-6.0	-4.0	-3.0	+12.4	+12.4	
57.0	77	-44.2				-42.2	-41.1	-30.0	-20.2	-10.2	-6.2	-4.2	-3.2	+11.6	+11.7	
58.0	66	-42.8				-41.8	-41.2	-32.5	-19.7	-11.5	-6.1	-4.0	-3.0	+1.4	+1.5	
59.0	56	-62.1				-45.7	-40.2	-29.1	-19.5	-10.5	-6.4	-4.4	-3.4	+3.1	+3.2	
60.0	41	-63.2					-37.0	-29.7	-19.0	-7.8	-4.5	-3.0	-2.0	+0.5	+0.5	
61.0	25	-51.5					-44.7	-34.0	-21.5	-11.0	-6.2	-4.2	-3.2	+11.1	+11.1	
62.0	14	-59.2						-50.1	-24.0	-14.0	-8.1	-5.1	-4.1	+15.4	+15.4	
63.0	11	-62.5						-57.3	-14.5	-8.1	-4.1	-3.1	-2.1	+12.0	+13.0	
64.0	4	-58.4							-13.5	-8.1	-4.1	-3.1	-2.1	+9.4	+9.4	
65.0	4	-51.1							-15.5	-8.1	-4.1	-3.1	-2.1	+3.8	+3.8	
66.0	5	-37.2							-17.5	-8.1	-4.1	-3.1	-2.1	+5.6	+5.6	
67.0	4	-47.4							-11.0	-13.5	-8.1	-4.1	-3.1	+14.3	+14.3	
68.0	5	-51.4							-12.5	-6.7	-4.2	-3.2	-2.2	+5.6	+5.6	
69.0	5	-24.3							-17.5	-4.8	-4.1	-3.1	-2.1	+3.0	+3.0	
70.0	5	-39.1							-0.5	-4.1	-4.1	-3.1	-2.1	+7.5	+7.5	

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.8

DATA SOURCE										AUGUST						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-5.0			-4.4	-3.8	-3.2	-1.7	-0.4	+1.3	+2.6	+3.6	+5.1	+7.9	+12.0	
1.0	744	-12.0		-11.9	-8.1	-6.3	-4.1	-1.8	+0.5	+4.2	+6.9	+8.5	+10.5	+16.9	+27.0	
2.0	744	-9.0			-7.7	-6.5	-4.7	-2.3	+0.2	+4.3	+6.8	+8.8	+10.5	+15.9	+26.0	
3.0	744	-10.0			-6.9	-6.0	-4.9	-2.6	+0.3	+4.5	+7.2	+9.3	+10.6	+16.9	+22.0	
4.0	744	-9.0		-8.9	-7.3	-6.6	-5.3	-2.5	+0.4	+4.6	+7.8	+10.5	+12.5	+16.9	+20.0	
5.0	744	-13.0			-8.6	-7.1	-5.7	-2.8	+0.0	+4.8	+8.6	+11.6	+13.7	+16.9	+19.0	
6.0	744	-16.0			-9.6	-8.0	-6.2	-3.5	+0.1	+4.6	+8.2	+11.0	+14.8	+18.9	+22.0	
7.0	744	-20.0		-17.9	-11.8	-9.0	-7.2	-4.1	+0.4	+4.2	+8.3	+10.7	+15.5	+19.9	+24.0	
8.0	744	-21.0		-19.9	-11.9	-10.2	-8.9	-5.6	+0.6	+4.0	+8.4	+11.3	+12.9	+19.9	+22.0	
9.0	744	-26.0		-20.9	-14.3	-12.8	-10.3	-6.7	+0.6	+3.9	+8.8	+12.3	+15.2	+21.9	+30.0	
10.0	744	-33.0		-29.9	-19.1	-16.5	-13.2	-8.2	+0.9	+4.7	+9.7	+14.5	+17.3	+24.9	+50.0	
11.0	744	-40.0		-34.9	-22.9	-18.0	-15.0	-9.8	+1.3	+5.5	+11.7	+16.0	+19.2	+30.9	+47.0	
12.0	744	-42.0			-26.5	-21.0	-17.3	-11.4	+2.1	+6.3	+12.9	+16.8	+20.5	+31.9	+43.0	
13.0	744	-43.0		-41.9	-26.8	-23.0	-18.1	-12.4	+3.5	+5.9	+11.9	+17.0	+20.7	+29.9	+38.0	
14.0	744	-34.0		-31.9	-25.5	-21.6	-16.7	-12.0	+4.1	+3.7	+9.3	+13.5	+17.3	+22.9	+26.0	
15.0	744	-24.0		-22.9	-18.2	-15.5	-12.7	-9.4	+3.5	+1.8	+6.5	+8.4	+11.2	+14.4	+15.0	
16.0	744	-17.0			-14.8	-12.8	-10.7	-7.6	+3.1	+0.1	+3.7	+5.1	+6.7	+8.4	+9.0	
17.0	744	-18.0		-14.9	-11.9	-11.0	-9.7	-7.0	+3.6	+0.4	+1.4	+2.5	+3.8	+5.9	+7.0	
18.0	744	-14.0		-13.9	-11.1	-10.5	-9.5	-7.4	+4.5	+1.5	+0.2	+0.8	+2.5	+5.9	+7.0	
19.0	744	-16.0		-14.9	-12.9	-11.6	-10.6	-8.7	+5.7	+2.6	+0.7	+0.2	+0.4	+1.9	+3.0	
20.0	744	-20.0		-16.9	-13.4	-12.5	-11.5	-9.5	+6.8	+4.1	+2.3	+1.2	+0.5	+0.0	+1.0	
21.0	744	-24.0		-17.9	-14.9	-13.4	-11.9	-10.2	+7.4	+5.1	+3.5	+2.6	+1.8	+0.3	+0.0	
22.0	744	-20.0		-16.9	-14.9	-13.9	-12.9	-11.0	+8.2	+5.5	+4.0	+2.8	+2.1	+1.0	+0.0	
23.0	744	-21.0		-20.9	-16.6	-15.5	-14.1	-11.8	+8.5	+5.6	+4.0	+2.8	+1.8	+0.3	+0.0	
24.0	744	-23.0		-20.9	-17.9	-16.0	-14.3	-12.2	+9.0	+6.2	+4.1	+3.2	+2.5	+0.5	+0.0	
25.0	744	-25.0		-20.9	-17.2	-16.3	-14.8	-12.7	+9.7	+7.0	+5.1	+4.1	+3.1	+1.0	+0.0	
26.0	744	-23.0		-20.9	-18.3	-17.0	-15.6	-13.6	+10.3	+7.4	+5.2	+4.4	+3.8	+2.0	+0.0	
27.0	744	-25.0		-22.9	-19.5	-18.0	-16.7	-14.2	+10.9	+7.7	+5.6	+4.5	+3.8	+3.0	+1.0	
28.0	110	-17.6			-17.6	-16.6	-14.0	-10.4	+7.4	+5.5	+4.5	+3.5	+2.5	+2.0	+1.0	
29.0	113	-20.0			-20.0	-18.4	-17.7	-14.8	+7.8	+5.2	+4.0	+3.0	+2.4	+2.4	+2.3	
30.0	113	-23.2			-19.0	-17.7	-16.6	-14.6	+10.7	+7.0	+5.3	+3.8	+3.1	+2.4	+2.3	
31.0	115	-33.2			-19.8	-17.0	-17.2	-14.4	+10.4	+7.1	+5.1	+4.0	+3.2	+1.1	+1.0	
32.0	115	-18.7			-18.4	-18.1	-14.6	-10.9	+6.2	+2.7	+0.6	+0.4	+0.4	+1.5	+1.6	
33.0	115	-23.4			-19.8	-18.4	-17.6	-14.3	+11.0	+7.0	+5.4	+3.8	+3.0	+2.0	+1.6	
34.0	117	-22.0			-20.8	-19.4	-17.7	-15.1	+11.5	+7.1	+5.1	+3.1	+1.8	+1.8	+1.6	
35.0	114	-24.8			-23.8	-22.3	-20.4	-16.0	+11.7	+6.0	+3.4	+0.0	+0.1	+3.1	+3.3	
36.0	118	-31.7			-20.0	-20.2	-19.5	-16.4	+11.7	+6.5	+3.3	+0.3	+1.4	+13.5	+13.6	
37.0	120	-26.8			-25.4	-24.4	-22.0	-18.3	+11.7	+6.2	+2.0	+0.3	+1.4	+10.0	+11.0	
38.0	120	-24.7			-24.0	-24.1	-22.3	-17.0	+11.8	+7.5	+3.0	+0.3	+4.5	+5.4	+5.5	
39.0	120	-26.1			-24.0	-24.4	-23.0	-18.0	+12.0	+7.4	+4.5	+0.3	+2.8	+6.7	+6.8	
40.0	119	-28.0			-25.3	-22.8	-19.4	-14.0	+12.0	+8.4	+5.0	+3.7	+2.2	+6.5	+6.6	
41.0	117	-24.9			-27.8	-24.3	-22.0	-18.2	+12.2	+8.6	+5.2	+3.6	+2.1	+2.0	+2.2	
42.0	117	-20.7			-28.4	-25.6	-21.8	-16.4	+12.4	+8.4	+4.4	+3.7	+2.1	+1.5	+1.6	
43.0	117	-34.1			-30.8	-28.4	-27.7	-23.6	+12.7	+9.1	+4.9	+3.7	+2.1	+1.5	+1.6	
44.0	115	-34.8			-33.8	-32.4	-28.1	-23.4	+12.7	+9.1	+4.9	+3.7	+2.1	+1.5	+1.6	
45.0	114	-40.3			-29.0	-28.4	-27.3	-23.6	+12.7	+9.1	+4.9	+3.7	+2.1	+1.5	+1.6	
46.0	113	-37.8			-28.0	-27.4	-22.4	-18.5	+12.5	+8.5	+5.5	+3.5	+2.0	+1.0	+1.0	
47.0	110	-42.4			-35.0	-33.7	-28.7	-21.8	+13.0	+9.0	+5.5	+3.5	+2.0	+1.0	+1.0	
48.0	110	-37.9			-36.0	-35.5	-29.7	-20.8	+13.1	+9.1	+5.4	+3.5	+2.0	+1.0	+1.0	
49.0	104	-45.4			-42.0	-40.5	-34.8	-21.4	+12.2	+8.4	+5.1	+3.0	+1.0	+0.5	+0.5	
50.0	105	-44.5			-37.0	-36.3	-34.7	-23.1	+12.5	+8.4	+5.4	+3.4	+1.8	+0.8	+0.8	
51.0	105	-57.0			-31.6	-29.4	-24.2	-11.6	+3.8	+3.0	+2.0	+1.0	+0.5	+0.5	+0.5	
52.0	98	-67.1			-35.4	-30.1	-22.7	-11.0	+2.4	+2.1	+1.0	+0.0	+0.0	+0.0	+0.0	
53.0	96	-52.3			-37.0	-32.7	-22.4	-11.7	+0.1	+6.1	+7.0	+18.0	+19.0	+19.2	+19.2	
54.0	91	-54.2			-36.1	-31.4	-21.0	+10.5	+1.4	+4.6	+12.1	+14.1	+14.7	+14.7	+14.8	
55.0	85	-42.0			-35.3	-34.1	-19.4	+0.1	+2.1	+11.3	+10.3	+20.2	+20.5	+20.6	+20.6	
56.0	75	-42.5			-39.8	-35.0	-19.2	+4.2	+5.3	+11.0	+12.4	+14.5	+15.1	+15.2	+15.2	
57.0	61	-42.3			-34.0	-26.6	-18.4	+2.5	+4.4	+14.3	+15.0	+23.3	+23.6	+23.6	+23.6	
58.0	43	-37.6			-23.1	-13.1	+2.5	+1.6	+1.6	+24.2	+41.1	+41.6	+41.7	+41.8	+41.8	
59.0	37	-34.7			-25.6	-17.7	+3.5	+1.7	+1.7	+25.7	+33.2	+33.4	+33.5	+33.5	+33.5	
60.0	27	-27.8			-28.6	-17.7	+3.5	+1.7	+1.7	+25.7	+33.2	+33.4	+33.5	+33.5	+33.5	
61.0	27	-24.9				-21.0	+3.5	+1.7	+1.7	+25.7	+33.2	+33.4	+33.5	+33.5	+33.5	
62.0	19	-23.6				-23.5	+4.0	+1.5	+1.5	+31.1	+31.6	+31.6	+31.7	+31.7	+31.7	
63.0	16	-24.5				-16.4	+1.0	+0.4	+0.4	+17.5	+17.5	+18.0	+18.0	+18.0	+18.1	
64.0	10	-17.6				-21.7	+6.0	+4.7	+4.7	+13.3	+13.3	+13.6	+13.6	+13.6	+13.6	
65.0	8	-29.3				-5.7	+2.1	+1.0	+1.0	+15.0	+17.1	+17.3	+17.3	+17.3	+17.4	
66.0	7	-16.6				-10.0	+6.0	+6.5	+6.5	+6.4	+6.4	+6.4	+6.4	+6.4	+6.4	
67.0	6	-27.0				-10.5	+4.2	+4.6	+4.6	+4.7	+4.7	+4.7	+4.7	+4.7	+4.7	
68.0	5	-26.5				-11.0	+6.2	+6.5	+6.5	+6.4	+6.4	+6.4	+6.4	+6.4	+6.4	
69.0	4	-13.6				-12.0	+20.4	+21.0	+21.0	+21.1	+21.1	+21.2	+21.2	+21.2	+21.2	
70.0	4	-14.1														

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.9

DATA SOURCE											SEPTEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA										
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956					EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)					
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-18.0			-10.8	-7.9	-6.3	-3.7	-0.9	+0.5	+2.6	+4.4	+6.9	+11.0	+12.0	
1.0	720	-21.0			-16.7	-11.7	-9.5	-5.8	-0.9	+3.2	+8.0	+11.7	+19.2	+29.0	+30.0	
2.0	720	-20.0			-15.2	-10.8	-7.8	-4.9	-0.6	+4.1	+9.0	+12.6	+19.1	+31.0	+32.0	
3.0	720	-20.0			-12.9	-9.1	-7.1	-4.3	-0.4	+4.6	+9.6	+13.5	+18.4	+34.0	+35.0	
4.0	720	-19.0			-12.7	-8.8	-7.0	-3.9	-0.3	+5.3	+10.6	+13.8	+17.8	+28.0	+29.0	
5.0	720	-23.0			-13.7	-9.6	-7.7	-4.2	-0.4	+5.5	+11.9	+14.8	+16.8	+26.0	+27.0	
6.0	720	-24.0			-13.5	-11.1	-8.3	-4.7	-0.4	+5.8	+11.3	+15.2	+17.9	+22.0	+23.0	
7.0	720	-28.0			-17.7	-12.9	-8.8	-5.0	-0.3	+7.5	+14.8	+18.1	+21.6	+26.0	+27.0	
8.0	720	-30.0			-18.7	-14.8	-10.1	-5.5	-0.2	+8.9	+16.5	+20.7	+22.9	+28.5	+29.0	
9.0	720	-31.0			-17.3	-14.4	-10.6	-6.3	-0.0	+8.9	+16.5	+20.7	+22.9	+28.5	+29.0	
10.0	720	-32.0			-18.9	-16.6	-12.6	-7.5	-0.3	+9.9	+18.5	+21.9	+25.4	+31.0	+32.0	
11.0	720	-35.0			-24.1	-19.8	-14.5	-8.5	-0.8	+11.3	+19.2	+22.8	+25.9	+33.0	+34.0	
12.0	720	-31.0			-26.1	-20.9	-16.7	-10.0	-0.9	+12.3	+20.2	+23.4	+27.2	+34.0	+35.0	
13.0	720	-34.0			-25.6	-22.9	-19.3	-10.3	-0.5	+12.5	+20.0	+23.1	+27.6	+30.7	+31.0	
14.0	720	-33.0			-25.7	-22.5	-18.0	-11.1	-0.1	+10.6	+17.0	+19.6	+20.9	+28.0	+29.0	
15.0	720	-25.0			-19.1	-15.6	-9.3	-5.3	-0.6	+7.1	+11.8	+13.8	+17.2	+21.0	+22.0	
16.0	720	-22.0			-18.2	-14.8	-12.6	-7.7	-1.2	+3.7	+7.4	+9.4	+11.6	+22.0	+23.0	
17.0	720	-19.0			-13.4	-11.7	-9.4	-6.7	-1.6	+1.7	+4.5	+6.0	+7.4	+12.0	+13.0	
18.0	720	-19.0			-11.1	-9.9	-9.0	-6.4	-2.4	+0.1	+2.7	+4.9	+6.1	+10.0	+11.0	
19.0	720	-16.0			-11.4	-9.9	-8.8	-6.7	-3.6	-0.6	+1.1	+2.4	+3.9	+9.0	+10.0	
20.0	720	-15.0			-11.6	-10.6	-9.3	-7.4	-4.6	-1.3	+0.1	+1.1	+2.5	+5.0	+6.0	
21.0	720	-15.0			-12.3	-10.6	-9.6	-8.1	-5.0	-2.2	-0.5	+0.2	+1.9	+4.0	+5.0	
22.0	720	-14.0			-12.1	-10.9	-10.2	-8.7	-5.6	-2.9	-0.9	-0.3	-0.0	+1.0	+2.0	
23.0	720	-18.0			-12.9	-12.0	-10.8	-9.0	-6.0	-3.2	-1.7	-0.7	-0.1	+1.5	+2.0	
24.0	720	-19.0			-13.7	-12.8	-11.6	-9.5	-7.0	-3.9	-1.4	-0.6	+0.2	+3.0	+4.0	
25.0	720	-18.0			-14.9	-13.6	-12.5	-10.3	-7.0	-3.9	-1.4	-0.6	+0.2	+3.0	+4.0	
26.0	720	-18.0			-15.9	-14.5	-12.8	-10.7	-7.4	-4.1	-2.1	-0.9	-0.1	+2.0	+3.0	
27.0	720	-19.0			-16.4	-14.7	-13.5	-10.9	-7.4	-3.9	-2.0	-0.6	+0.1	+1.5	+2.0	
28.0	105	-17.2			-15.0	-14.5	-13.0	-11.1	-7.1	-1.0	0.6	2.6	5.0	7.4	7.5	
29.0	107	-22.0			-16.0	-15.5	-13.7	-11.0	-6.3	-2.7	0.2	1.3	2.0	6.5	6.6	
30.0	108	-15.6			-14.0	-13.5	-12.2	-10.4	-6.5	-1.7	1.2	3.3	4.0	6.0	7.0	
31.0	109	-15.6			-14.0	-13.8	-12.3	-10.8	-6.4	-0.0	1.2	5.3	6.0	9.5	9.6	
32.0	108	-16.7			-14.0	-13.8	-11.8	-10.2	-8.7	-0.5	2.4	8.6	9.0	13.0	13.5	
33.0	109	-14.6			-13.0	-12.8	-11.6	-9.0	-8.4	-0.7	4.0	6.6	7.0	9.1	9.1	
34.0	109	-13.3					-11.0	-8.0	-8.0	0.3	4.0	6.6	7.0	9.0	9.0	
35.0	108	-18.9			-15.0	-14.5	-12.8	-10.6	-8.0	-1.1	4.7	6.7	8.0	10.7	10.9	
36.0	108	-17.3			-16.0	-15.5	-11.0	-9.0	-4.4	1.4	3.0	4.0	6.5	7.2	7.2	
37.0	107	-18.7			-16.0	-15.6	-12.6	-10.3	-7.8	1.5	5.3	7.6	8.3	10.7	10.9	
38.0	106	-22.3			-17.0	-16.9	-14.3	-10.0	-5.3	0.5	6.7	9.3	10.0	10.8	10.9	
39.0	106	-18.7			-18.7	-17.8	-14.8	-10.6	-8.0	0.6	5.7	8.0	9.0	11.2	11.3	
40.0	105	-17.8			-17.7	-17.3	-14.8	-11.7	-5.3	2.4	5.4	6.6	8.7	9.3	9.4	
41.0	102	-21.1			-21.0	-19.7	-17.0	-15.0	-8.4	2.4	6.6	11.3	12.0	14.7	14.8	
42.0	102	-22.5					-18.4	-15.4	-8.5	2.4	6.6	8.7	10.0	14.2	14.4	
43.0	100	-21.9					-21.0	-19.5	-15.4	3.5	7.7	10.7	12.0	14.1	14.3	
44.0	99	-31.7			-23.6	-22.5	-11.6	-8.5	-4.5	3.4	9.3	10.7	12.0	14.1	14.3	
45.0	95	-30.6			-19.8	-18.6	-10.6	-8.0	-3.0	4.0	7.6	9.6	14.0	17.0	17.1	
46.0	94	-24.5			-19.0	-17.1	-10.0	-7.0	-2.0	5.2	9.4	14.0	20.0	20.6	20.7	
47.0	86	-17.3			-12.8	-12.8	-10.1	-8.7	7.1	13.0	14.7	15.1	15.9	16.0	16.0	
48.0	85	-18.0			-16.1	-11.7	-9.0	-1.1	6.8	10.0	14.1	16.1	16.5	16.6	16.6	
49.0	83	-10.7			-18.1	-13.8	-8.7	-0.7	9.6	12.3	13.1	13.7	14.2	14.3	14.3	
50.0	81	-17.3			-16.4	-10.0	-6.6	1.5	10.6	15.0	17.6	23.2	23.0	24.0	24.0	
51.0	76	-18.3			-17.3	-14.2	-7.0	2.5	10.6	14.5	19.3	21.3	22.1	22.2	22.2	
52.0	66	-19.5			-14.7	-10.7	-6.5	2.2	11.4	18.7	17.6	20.4	21.0	21.1	21.1	
53.0	61	-14.5			-14.3	-12.0	-3.7	3.0	13.1	17.0	19.6	20.4	21.0	21.1	21.1	
54.0	58	-13.8			-13.7	-11.1	-2.8	7.0	14.4	19.7	21.7	31.4	31.4	31.4	31.4	
55.0	54	-15.0			-11.7	-9.6	-2.3	5.5	12.5	25.1	25.0	37.5	38.2	38.2	38.2	
56.0	46	-14.4			-9.0	-6.8	-2.2	5.5	13.0	20.7	22.0	32.3	32.5	32.5	32.5	
57.0	37	-5.2					-1.4	1.4	6.9	12.1	18.2	22.0	22.4	23.0	23.0	
58.0	31	-5.6					-3.4	4.5	9.3	14.1	18.7	24.3	24.7	24.9	25.0	
59.0	20	-6.4					-5.0	6.1	10.0	17.3	21.0	22.8	23.0	23.0	23.0	
60.0	12	-0.5						-5.1	9.0	24.1	27.6	27.6	28.2	28.2	28.2	
61.0	4	-13.7					-12.7	5.0	12.7	40.7	41.0	41.1	41.2	41.2	41.2	
62.0	6	-19.3						-15.0	12.0	12.5	12.6	12.6	12.7	12.7	12.7	
63.0	6	-27.5						-13.0	7.1	7.0	9.1	9.2	9.2	9.2	9.2	
64.0	2	-2.9						-3.0	0.9	1.0	1.1	1.1	1.2	1.2	1.2	
65.0	1	-13.6														
66.0	1	-14.4														
67.0	1	-16.5														
68.0	1	-15.6														
69.0	1	-10.6														
70.0	1	0.3														

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.10

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-15.0		-14.9	-9.7	-7.6	-6.6	-4.6	-1.4	+0.2	+2.1	+3.1	+4.3	+6.9	+12.0	
1.0	744	-17.0		-16.9	-14.7	-12.6	-11.1	-7.6	-2.1	+2.9	+7.1	+9.3	+11.5	+15.9	+17.0	
2.0	744	-19.0		-16.9	-13.8	-11.6	-9.1	-5.2	-0.5	+4.5	+8.7	+11.8	+14.5	+17.9	+19.0	
3.0	744	-14.0		-13.9	-11.7	-9.8	-7.7	-3.9	+0.0	+5.8	+10.6	+13.2	+16.6	+19.9	+21.0	
4.0	744	-14.0			-10.6	-8.7	-7.0	-3.3	+1.1	+7.2	+11.9	+15.5	+19.2	+22.4	+23.0	
5.0	744	-19.0		-16.9	-12.1	-9.7	-7.1	-3.2	+2.0	+8.7	+14.0	+17.0	+22.5	+26.9	+28.0	
6.0	744	-21.0		-15.9	-13.3	-9.9	-7.6	-3.3	+2.9	+10.4	+16.1	+20.5	+23.8	+31.9	+38.0	
7.0	744	-18.0			-13.7	-11.0	-8.5	-2.7	+3.8	+12.6	+19.1	+22.8	+28.2	+36.9	+47.0	
8.0	744	-20.0		-19.9	-16.3	-12.6	-8.2	-2.4	+4.8	+15.2	+21.9	+26.5	+31.2	+39.9	+50.0	
9.0	744	-22.0			-19.1	-13.5	-8.8	-2.8	+6.4	+17.8	+26.0	+33.0	+36.8	+45.9	+62.0	
10.0	744	-23.0			-20.2	-16.3	-11.2	-3.3	+8.4	+20.9	+30.3	+36.0	+42.7	+50.9	+61.0	
11.0	744	-28.0		-25.9	-22.5	-16.5	-12.4	-4.1	+9.1	+24.4	+33.9	+42.0	+46.3	+49.9	+56.0	
12.0	744	-32.0		-27.9	-22.1	-16.6	-13.1	-4.7	+9.5	+25.8	+35.2	+42.0	+46.5	+52.9	+55.0	
13.0	744	-34.0		-32.9	-20.7	-16.3	-12.4	-4.2	+9.4	+23.2	+32.9	+38.3	+41.7	+50.9	+52.0	
14.0	744	-29.0		-24.9	-19.5	-15.6	-11.1	-3.1	+8.0	+19.9	+26.9	+31.5	+33.8	+38.9	+42.0	
15.0	744	-24.0		-23.9	-19.5	-12.1	-9.1	-2.5	+6.5	+16.0	+20.8	+26.7	+28.7	+33.9	+35.0	
16.0	744	-21.0		-20.9	-13.2	-9.6	-6.9	-2.5	+4.1	+11.5	+16.2	+19.5	+22.3	+30.4	+31.0	
17.0	744	-14.0			-8.8	-6.9	-5.7	-2.6	+1.9	+7.7	+12.1	+15.0	+19.2	+29.4	+30.0	
18.0	744	-10.0		-9.9	-7.9	-6.8	-5.7	-3.3	+0.0	+4.2	+8.3	+11.5	+15.2	+23.9	+33.0	
19.0	744	-10.0			-8.4	-7.1	-6.1	-3.9	+0.8	+2.1	+5.6	+8.0	+10.7	+20.9	+24.0	
20.0	744	-10.0			-8.5	-7.6	-6.5	-4.6	-1.4	+0.9	+4.2	+5.8	+7.8	+14.9	+20.0	
21.0	744	-13.0		-11.9	-9.3	-8.1	-7.2	-5.0	-1.8	+0.5	+2.8	+4.5	+6.8	+10.9	+14.0	
22.0	744	-12.0			-9.8	-8.4	-7.3	-5.4	-2.3	+0.0	+2.4	+3.8	+4.9	+7.9	+11.0	
23.0	744	-13.0		-12.9	-10.9	-9.5	-7.9	-5.7	-2.3	+0.0	+2.3	+3.7	+5.1	+6.9	+8.0	
24.0	744	-12.0		-11.9	-9.8	-9.0	-7.8	-5.7	-2.3	+0.0	+2.7	+4.2	+6.1	+8.9	+10.0	
25.0	744	-11.0			-9.9	-8.8	-7.7	-5.8	-2.3	+0.7	+3.1	+4.2	+5.9	+8.9	+11.0	
26.0	744	-13.0			-11.2	-9.7	-8.6	-6.0	-1.9	+1.5	+4.1	+4.9	+5.7	+6.9	+10.0	
27.0	744	-13.0			-11.5	-9.8	-8.6	-6.0	-1.8	+2.1	+5.0	+6.4	+7.6	+9.9	+12.0	
28.0	74	-10.8			-10.2	-8.1	-6.9	-4.9	0.5	5.9	8.1	10.2	11.1	11.6	11.7	
29.0	82	-10.6			-9.7	-8.9	-5.0	0.7	6.7	9.5	11.4	11.4	11.4	11.6	11.7	
30.0	84	-7.0				-6.4	-4.3	1.4	7.7	11.6	15.1	17.2	18.0	18.2	18.2	
31.0	85	-9.6				-8.7	-7.7	-2.0	2.5	4.1	11.9	16.1	20.1	20.4	20.9	
32.0	90	-13.5				-7.0	-6.2	-1.9	4.1	10.1	13.3	15.4	22.1	23.0	23.1	
33.0	90	-12.1				-7.0	-5.2	-1.7	4.3	10.4	15.6	17.4	25.1	25.4	25.9	
34.0	90	-8.4					-5.5	-1.3	4.3	11.4	16.4	17.4	19.1	20.0	20.1	
35.0	90	-13.9				-12.0	-8.5	-3.2	3.3	12.6	17.4	19.4	24.1	24.5	24.6	
36.0	91	-15.2				-11.9	-9.5	-3.3	4.9	12.1	15.7	16.6	20.1	20.9	21.0	
37.0	90	-15.2				-14.0	-9.8	-8.2	4.4	11.0	16.3	19.4	19.7	20.0	20.0	
38.0	89	-16.9				-9.0	-7.8	-4.3	4.5	14.9	20.5	22.4	22.4	23.0	23.0	
39.0	94	-7.6				-6.4	-5.2	-1.1	6.5	19.1	25.2	26.0	30.4	31.4	31.5	
40.0	95	-9.4				-5.8	-2.9	0.0	8.1	20.9	27.3	30.4	35.1	35.0	36.1	
41.0	94	-6.7				-6.4	-3.6	1.5	9.2	20.5	29.3	33.0	34.1	35.0	35.1	
42.0	97	-9.7				-8.9	-4.6	2.3	10.6	22.4	30.6	33.0	38.0	38.7	38.8	
43.0	97	-9.9				-8.4	-2.6	3.1	12.1	23.6	32.2	34.0	41.0	42.1	42.2	
44.0	94	-12.2				-6.4	-0.2	2.6	14.3	25.7	35.4	40.0	45.1	46.0	46.2	
45.0	92	-10.2				-6.0	-2.4	3.8	15.7	27.7	40.4	44.0	47.0	47.4	47.5	
46.0	93	-14.8				-3.0	-0.7	4.4	17.3	31.6	39.4	43.0	49.1	50.0	50.1	
47.0	91	-9.6				-2.9	-1.2	6.3	19.4	31.8	40.7	44.0	52.1	52.0	53.1	
48.0	89	-0.7				-0.7	0.7	8.3	18.9	32.0	42.2	43.0	57.1	58.0	59.1	
49.0	86	-1.4				0.0	1.2	6.7	22.3	37.4	45.7	54.0	62.2	63.0	63.2	
50.0	84	-1.9				-0.5	2.6	8.1	23.4	40.3	47.9	57.1	66.1	66.5	66.6	
51.0	79	-2.2				2.2	2.7	7.8	21.9	39.5	48.1	59.1	59.4	60.3	60.4	
52.0	75	-2.4					3.8	8.9	24.5	42.1	51.3	62.3	68.2	68.7	68.8	
53.0	70	-2.7				1.4	3.6	9.3	24.8	41.4	51.6	62.3	62.3	62.9	62.9	
54.0	63	-1.5				4.2	5.2	11.2	23.5	41.0	51.9	64.4	59.4	60.0	60.0	
55.0	57	-0.7				1.3	5.9	10.0	23.3	37.0	53.1	53.0	61.4	62.2	62.3	
56.0	48	-1.8				0.4	8.3	8.3	24.0	37.4	50.6	53.0	58.4	57.0	57.1	
57.0	40	-4.9				-0.9	0.0	9.2	23.0	37.3	48.0	56.1	56.4	56.9	56.9	
58.0	34	-10.1					-6.3	10.1	22.0	33.6	45.3	56.9	56.6	56.9	57.0	
59.0	27	-13.2					2.4	11.1	20.4	38.7	49.7	50.0	50.4	51.0	51.0	
60.0	22	-12.6					-3.9	10.2	21.0	37.5	52.9	54.4	54.9	55.1	55.2	
61.0	14	11.8						14.6	21.0	34.8	59.3	59.4	60.0	60.1	60.2	
62.0	4	15.1							20.0	34.0	38.9	39.0	39.1	39.1	39.1	
63.0	2	12.1							12.0	45.3	46.2	46.2	46.3	46.3	46.3	
64.0	1	16.9													16.9	
65.0	1	27.0													27.0	
66.0	1	17.3													17.3	
67.0	1	10.2													10.2	
68.0	1	3.1													3.1	
69.0	1	6.2													6.2	
70.0	1	17.2													17.2	

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM DBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-9.0			-7.5	-6.7	-5.8	-3.8	-0.8	+0.4	+2.1	+3.1	+3.9	+7.0	+8.0	
1.0	720	-20.0			-14.3	-12.8	-10.1	-6.7	-0.9	+1.1	+8.3	+11.3	+13.4	+22.0	+23.0	
2.0	720	-21.0			-14.2	-11.1	-8.5	-4.6	-0.2	+5.5	+10.6	+13.9	+17.7	+29.0	+30.0	
3.0	720	-20.0			-9.9	-8.3	-6.8	-3.7	+0.3	+7.3	+13.4	+16.8	+18.9	+28.0	+29.0	
4.0	720	-14.0			-11.4	-9.8	-7.3	-2.9	+1.4	+8.9	+14.8	+19.5	+23.4	+28.0	+29.0	
5.0	720	-15.0			-12.3	-10.1	-6.9	-3.0	+2.6	+11.1	+17.4	+23.1	+25.9	+35.0	+36.0	
6.0	720	-18.0			-12.7	-10.3	-7.2	-2.6	+3.6	+14.0	+21.2	+26.5	+27.9	+35.0	+36.0	
7.0	720	-19.0			-14.3	-11.3	-8.5	-2.1	+4.9	+16.2	+24.6	+29.8	+35.4	+40.0	+41.0	
8.0	720	-23.0			-16.6	-13.8	-9.0	-2.4	+6.2	+17.9	+29.4	+34.5	+41.8	+50.0	+51.0	
9.0	720	-28.0			-19.5	-16.3	-11.4	-2.1	+8.1	+21.4	+32.5	+39.7	+43.8	+71.0	+72.0	
10.0	720	-34.0			-24.3	-19.3	-12.6	-3.0	+9.8	+23.7	+38.1	+44.5	+49.9	+74.0	+75.0	
11.0	720	-35.0			-24.5	-20.7	-13.5	-2.9	+10.8	+26.3	+40.3	+51.2	+58.8	+81.0	+82.0	
12.0	720	-38.0			-25.4	-20.4	-13.7	-2.9	+11.4	+28.1	+42.0	+52.5	+61.9	+86.0	+87.0	
13.0	720	-32.0			-20.8	-17.3	-12.5	-0.9	+11.8	+26.9	+38.6	+46.5	+56.8	+84.0	+85.0	
14.0	720	-26.0			-21.7	-13.1	-9.0	-0.4	+10.5	+24.1	+33.7	+41.8	+45.8	+71.0	+72.0	
15.0	720	-27.0			-17.7	-10.8	-6.7	-0.2	+9.6	+20.3	+27.4	+31.5	+35.9	+63.0	+64.0	
16.0	720	-20.0			-12.7	-8.3	-5.7	-0.4	+7.1	+16.6	+22.4	+26.7	+30.4	+44.0	+45.0	
17.0	720	-18.0			-12.3	-8.1	-5.0	-0.7	+5.0	+12.2	+17.7	+20.8	+23.8	+41.0	+42.0	
18.0	720	-13.0			-9.9	-8.1	-5.2	-1.1	+2.8	+8.6	+13.5	+15.3	+18.2	+24.0	+25.0	
19.0	720	-9.0			-7.9	-6.6	-4.8	-1.7	+1.4	+5.8	+10.5	+12.9	+15.7	+18.6	+19.0	
20.0	720	-8.0			-6.8	-5.8	-4.7	-2.1	+0.4	+4.5	+8.5	+11.3	+13.2	+20.0	+21.0	
21.0	720	-11.0			-7.4	-6.2	-4.6	-2.3	+0.3	+4.2	+8.1	+10.1	+14.9	+22.0	+23.0	
22.0	720	-12.0			-7.7	-6.4	-5.1	-2.6	+0.4	+4.6	+7.8	+11.6	+14.7	+22.5	+23.0	
23.0	720	-14.0			-8.4	-6.5	-5.2	-2.3	+1.1	+5.5	+8.6	+11.1	+13.9	+20.0	+21.0	
24.0	720	-14.0			-8.9	-7.0	-5.1	-2.0	+1.9	+6.5	+10.0	+11.9	+13.2	+17.0	+18.0	
25.0	720	-14.0			-9.6	-8.1	-6.4	-2.0	+3.0	+7.7	+11.0	+12.6	+14.4	+23.0	+24.0	
26.0	720	-13.0			-10.3	-7.9	-6.0	-1.7	+3.4	+9.0	+12.2	+13.9	+15.7	+17.0	+18.0	
27.0	720	-10.0			-11.7	-8.1	-4.9	-0.7	+4.4	+10.4	+13.3	+15.3	+17.2	+20.0	+21.0	
28.0	80	-5.1			-4.5	-1.8	3.0	9.4	15.3	18.3	20.0	23.1	25.6	25.6	25.6	
29.0	90	-7.1			-3.0	-2.2	3.1	10.3	16.0	21.4	23.4	25.1	25.6	25.6	25.6	
30.0	90	-9.2			-3.0	-0.3	4.1	11.4	18.0	24.3	25.6	27.1	27.1	27.1	27.1	
31.0	91	-12.7			-3.0	-0.5	5.1	13.5	19.4	24.2	25.6	27.1	27.1	27.1	27.1	
32.0	91	-6.6			-2.0	-0.5	5.2	14.0	22.4	26.4	27.0	28.7	29.2	29.2	29.2	
33.0	92	-5.5			-5.0	2.3	8.4	15.3	24.7	28.2	29.0	35.1	36.1	36.1	36.1	
34.0	92	-10.1			-5.0	3.3	8.4	17.5	24.0	30.5	31.0	37.0	37.5	37.5	37.5	
35.0	92	-8.9			-2.0	2.6	7.6	18.0	29.4	32.4	37.0	38.4	39.4	39.4	39.4	
36.0	90	-9.9			-4.0	0.5	8.6	17.7	25.9	33.3	36.0	41.1	41.3	41.3	41.3	
37.0	91	-11.4			-1.0	3.5	10.4	19.5	29.0	36.5	39.0	47.1	48.3	48.3	48.3	
38.0	95	-12.2			-3.8	2.8	8.4	21.3	32.7	39.3	45.0	53.0	53.4	53.4	53.4	
39.0	94	-5.6			-5.4	2.7	12.3	22.5	35.2	41.2	48.0	54.0	54.6	54.6	54.6	
40.0	93	-5.4			0.1	3.7	13.8	24.3	37.5	46.4	50.4	55.0	55.4	55.4	55.4	
41.0	93	-3.6			-1.0	3.7	10.0	25.4	40.0	49.4	51.0	56.1	56.7	56.7	56.7	
42.0	93	-4.5			1.1	5.9	14.4	28.4	42.2	53.4	55.0	57.6	58.1	58.2	58.2	
43.0	92	-2.9			0.5	5.6	17.9	33.0	46.4	57.5	59.0	64.1	64.6	64.6	64.6	
44.0	84	1.1			8.5	10.4	21.0	34.0	53.0	65.4	72.4	73.0	73.3	73.4	73.4	
45.0	87	1.2			3.0	17.4	25.4	39.3	56.1	70.7	80.6	80.6	81.3	81.3	81.3	
46.0	86	-0.7			5.0	19.1	25.2	40.5	60.4	82.7	85.0	89.2	89.2	89.2	89.2	
47.0	83	-2.2			11.0	20.2	30.1	44.3	63.4	84.4	90.1	91.6	91.6	91.7	91.7	
48.0	82	-2.6			7.0	23.4	32.2	47.0	64.5	79.9	84.4	89.2	89.2	89.2	89.2	
49.0	85	-2.3			13.0	24.6	33.1	49.5	68.4	78.9	85.1	94.1	94.7	94.7	94.7	
50.0	84	-0.1			16.0	22.2	31.3	51.0	70.3	80.4	84.1	86.2	87.0	87.2	87.2	
51.0	77	1.7			15.4	20.9	31.2	49.2	63.9	80.4	81.2	86.2	86.4	86.9	86.9	
52.0	74	0.3			14.7	23.4	29.9	47.0	66.5	75.1	82.3	89.3	89.1	89.2	89.2	
53.0	70	-2.1			12.4	19.4	30.1	47.0	67.0	80.3	81.4	89.2	89.5	89.5	89.5	
54.0	51	-2.7			10.4	19.1	26.7	43.5	69.3	79.0	88.4	97.5	94.1	94.2	94.2	
55.0	52	-1.6			5.2	9.6	27.5	52.0	67.7	76.4	77.8	84.5	85.1	85.2	85.2	
56.0	47	-1.3			1.1	11.4	27.7	47.5	67.2	70.7	73.0	80.4	80.4	80.4	80.4	
57.0	45	1.5			9.0	15.3	30.1	50.5	65.4	68.4	73.0	83.4	83.7	83.4	83.4	
58.0	34	9.9				19.9	30.0	53.3	66.0	69.5	74.9	79.4	79.2	79.3	79.3	
59.0	29	6.1				20.5	34.3	51.5	64.4	81.5	85.4	85.4	85.1	85.1	85.1	
60.0	21	10.6					20.1	34.3	55.5	65.4	75.0	84.5	86.7	86.9	86.9	
61.0	16	17.3						30.5	46.0	68.5	82.7	82.0	83.0	83.1	83.1	
62.0	15	21.8						29.4	43.5	77.4	82.2	82.5	82.7	82.4	82.4	
63.0	11	13.6						19.7	39.5	55.3	77.4	77.7	77.4	77.9	77.9	
64.0	7	15.6						19.1	29.5	60.9	69.7	69.0	70.0	70.1	70.1	
65.0	4	26.9							35.0	64.1	64.0	69.1	69.2	69.3	69.3	
66.0	4	25.8							29.0	54.3	56.7	55.4	56.0	56.0	56.0	
67.0	4	6.4							20.0	35.2	35.4	35.7	35.7	35.7	35.7	
68.0	4	-1.4							11.0	61.2	61.4	61.4	61.5	61.5	61.5	
69.0	3	-2.1							13.5	60.6	61.0	61.1	61.2	61.2	61.2	
70.0	2	-35.1							-35.0	84.4	84.5	84.5	84.5	84.5	84.5	

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

HEAD AND TAIL WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 2.12

DATA SOURCE							DECEMBER									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-8.0	-7.9	-7.3	-6.6	-5.2	-2.8	-0.8	-0.9	+2.7	+4.3	+5.7	+6.8	+7.0		
1.0	744	-16.0		-13.1	-10.8	-8.9	-5.2	-0.1	+5.7	+7.8	+12.0	+14.8	+18.9	+25.0		
2.0	744	-18.0		-14.9	-10.3	-6.9	-5.3	-1.6	+3.0	+9.7	+15.4	+18.4	+22.1	+28.4		
3.0	744	-24.0		-13.9	-10.3	-6.9	-5.3	-1.6	+3.0	+9.7	+15.4	+18.4	+22.1	+28.4		
4.0	744	-24.0		-14.9	-10.6	-7.8	-4.5	-0.9	+5.0	+12.8	+18.2	+21.7	+27.1	+32.9		
5.0	844	-21.0		-19.9	-11.7	-8.0	-4.9	-0.3	+6.7	+15.8	+22.4	+26.5	+33.5	+39.9		
6.0	744	-26.0		-21.9	-11.3	-8.2	-4.6	+0.0	+8.5	+18.6	+24.8	+30.2	+35.7	+44.9		
7.0	744	-26.0		-21.9	-11.7	-8.3	-4.9	+1.0	+10.5	+20.8	+28.8	+36.0	+40.5	+49.9		
8.0	744	-27.0		-21.9	-13.5	-8.7	-5.3	+1.8	+12.3	+23.8	+34.9	+41.5	+47.2	+59.9		
9.0	744	-35.0		-24.9	-14.5	-11.0	-7.5	+1.7	+14.1	+28.0	+39.8	+47.4	+52.7	+61.9		
10.0	744	-32.0		-26.9	-17.5	-13.0	-8.4	+2.1	+15.6	+32.4	+44.2	+49.3	+54.6	+67.9		
11.0	744	-25.0		-21.9	-16.2	-14.3	-8.6	+2.4	+16.8	+35.1	+45.9	+52.0	+61.5	+68.9		
12.0	744	-27.0		-19.9	-16.5	-13.0	-7.3	+2.3	+18.6	+36.4	+49.9	+57.0	+60.8	+69.9		
13.0	744	-19.0		-17.9	-14.5	-10.0	-3.6	+4.0	+18.5	+36.1	+48.4	+55.2	+60.5	+69.9		
14.0	744	-20.0		-14.9	-9.2	-5.0	-0.8	+5.9	+17.9	+32.6	+43.2	+50.5	+55.5	+62.9		
15.0	744	-17.0		-6.7	-3.1	-0.4	+0.4	+5.7	+16.2	+28.5	+36.2	+41.8	+48.5	+54.7		
16.0	744	-13.0		-6.5	-3.6	+0.6	+4.6	+14.1	+24.1	+31.2	+36.0	+40.7	+45.9	+51.0		
17.0	744	-17.0	-14.9	-7.8	-5.5	-2.1	+3.4	+11.2	+19.6	+26.9	+31.0	+34.5	+40.9	+49.0		
18.0	744	-10.0		-7.7	-4.8	-2.0	+1.2	+7.8	+16.0	+21.3	+24.8	+28.5	+32.9	+34.0		
19.0	744	-8.0		-7.3	-5.4	-3.1	+0.2	+4.8	+11.8	+17.7	+20.3	+22.5	+28.7	+29.0		
20.0	744	-11.0	-9.9	-6.4	-4.7	-2.9	-0.7	+3.1	+9.0	+14.5	+17.4	+19.1	+25.9	+27.0		
21.0	744	-10.0	-9.9	-6.3	-5.1	-3.5	-1.0	+2.4	+8.1	+12.7	+16.5	+20.5	+25.9	+30.0		
22.0	744	-9.0	-8.9	-6.3	-5.5	-4.1	-0.9	+2.4	+7.6	+11.7	+14.3	+18.8	+22.9	+24.0		
23.0	744	-13.0	-9.9	-6.7	-5.7	-4.4	-0.9	+3.2	+8.4	+11.8	+14.8	+16.7	+20.9	+22.0		
24.0	744	-10.0	-9.9	-6.7	-5.7	-4.4	-0.9	+3.2	+8.4	+11.8	+14.8	+16.7	+20.9	+22.0		
25.0	744	-20.0	-19.9	-7.6	-6.3	-3.9	-0.5	+4.3	+9.8	+13.8	+15.9	+19.2	+24.9	+27.0		
26.0	744	-13.0	-12.9	-9.6	-6.6	-4.2	-0.0	+5.3	+11.3	+16.0	+18.3	+20.1	+24.4	+25.0		
27.0	744	-18.0	-16.9	-9.2	-7.6	-3.9	-0.8	+7.3	+14.1	+18.7	+21.6	+23.5	+26.4	+27.0		
28.0	132	-15.1		-8.7	-6.7	-3.7	-0.3	+9.7	+17.7	+21.4	+23.0	+25.3	+25.8	+25.9		
29.0	134	-15.7		-6.7	-5.7	-4.3	1.2	+11.4	+19.1	+22.7	+23.7	+25.7	+27.1	+27.4		
30.0	132	-15.6		-6.6	-4.4	-1.6	2.4	+13.1	+21.7	+26.5	+29.0	+30.4	+32.4	+32.4		
31.0	140	-11.0		-8.6	-1.4	0.2	4.1	+16.4	+24.1	+27.3	+29.4	+39.4	+43.1	+43.3		
32.0	141	-9.2		-5.6	-1.4	0.0	5.3	+17.5	+25.4	+30.0	+31.0	+42.5	+48.1	+49.3		
33.0	141	-8.0		-7.6	-1.9	-0.6	4.3	+20.1	+26.7	+34.0	+39.0	+48.4	+53.7	+53.9		
34.0	141	-11.1		-7.6	-3.4	-1.5	4.4	+20.4	+27.4	+36.5	+44.0	+46.4	+54.4	+59.0		
35.0	141	-17.2		-12.6	-4.4	-1.5	2.6	+19.6	+29.4	+41.0	+43.0	+45.4	+47.0	+47.2		
36.0	141	-11.2		-7.6	-4.4	-2.4	2.7	+21.6	+29.3	+39.0	+45.0	+51.4	+56.4	+56.7		
37.0	141	-4.3		-7.4	-4.6	-1.4	1.3	+23.1	+30.7	+40.7	+46.0	+47.4	+64.4	+65.0		
38.0	141	-14.1		-13.4	-7.4	-4.0	1.4	+24.3	+31.4	+39.4	+52.4	+55.4	+62.4	+63.0		
39.0	142	-14.5		-15.6	-6.4	-2.4	2.4	+24.5	+30.7	+43.4	+47.4	+52.4	+54.0	+54.3		
40.0	142	-25.8		-17.6	-7.4	-4.3	3.6	+25.5	+37.1	+41.7	+50.0	+52.4	+53.4	+53.4		
41.0	142	-29.7		-19.6	-6.4	-2.7	4.1	+25.7	+36.6	+42.0	+44.4	+52.4	+53.0	+54.1		
42.0	140	-35.7		-24.6	-6.4	-5.0	3.7	+25.5	+37.9	+44.5	+45.0	+50.4	+53.0	+53.2		
43.0	132	-31.1		-24.6	-8.4	-2.4	3.7	+25.3	+34.0	+47.0	+47.4	+49.4	+52.4	+52.4		
44.0	140	-20.6		-22.4	-8.4	-4.0	3.4	+23.7	+37.4	+46.4	+44.4	+53.4	+57.4	+54.0		
45.0	134	-25.7		-19.6	-7.0	-4.1	4.0	+21.9	+30.4	+46.4	+45.4	+52.4	+53.7	+53.0		
46.0	137	-14.8		-14.6	-9.0	-5.6	4.9	+22.4	+40.4	+47.2	+49.4	+52.4	+57.1	+57.3		
47.0	134	-16.8		-13.6	-12.4	-7.1	4.5	+23.0	+44.1	+50.7	+55.0	+59.4	+61.4	+61.6		
48.0	136	-27.8		-17.6	-5.4	-1.4	4.4	+24.3	+44.2	+52.7	+51.0	+66.4	+67.0	+67.2		
49.0	130	-27.3		-14.7	-10.0	-1.4	4.3	+24.0	+44.4	+56.4	+55.4	+64.7	+67.4	+67.6		
50.0	127	-23.8		-17.7	-16.1	-1.7	5.1	+21.9	+44.6	+54.7	+63.1	+66.7	+67.4	+68.0		
51.0	122	-24.4		-14.4	-15.9	-6.0	6.1	+24.5	+45.3	+59.4	+62.4	+64.4	+69.1	+69.3		
52.0	115	-31.6		-19.4	-15.7	-8.2	5.1	+22.3	+45.4	+57.4	+67.0	+69.0	+72.1	+72.3		
53.0	110	-36.9		-21.0	-16.5	-10.7	3.7	+21.3	+45.5	+60.4	+69.4	+71.0	+81.2	+81.4		
54.0	102	-22.6		-20.0	-12.7	-10.9	3.2	+21.5	+40.4	+59.4	+71.7	+74.0	+84.7	+84.4		
55.0	92	-26.5		-15.0	-12.4	-12.4	2.3	+21.0	+44.1	+63.4	+74.0	+77.1	+77.6	+77.7		
56.0	81	-20.8		-14.2	-12.2	-5.0	3.3	+19.4	+40.0	+72.0	+77.2	+95.4	+96.3	+96.5		
57.0	67	-20.6		-19.5	-13.6	-1.4	1.4	+14.4	+52.7	+64.4	+75.4	+75.4	+76.2	+76.2		
58.0	51	-20.8		-18.4	-17.4	-4.0	4.0	+14.4	+44.4	+71.5	+76.4	+77.0	+77.3	+77.4		
59.0	30	-23.6		-23.1	-23.1	-23.1	1.2	+14.4	+34.4	+73.1	+94.1	+94.7	+95.1	+95.2		
60.0	22	-35.2		-19.4	-15.7	-10.0	3.5	+10.0	+36.4	+83.0	+109.7	+109.7	+109.4	+109.4		
61.0	15	-34.8		-14.4	-15.7	-10.0	3.5	+10.0	+36.4	+83.0	+109.7	+109.7	+109.4	+109.4		
62.0	4	12.5		-1.4	-1.4	-1.4	1.4	+11.5	+45.4	+94.4	+94.4	+100.1	+100.3	+100.3		
63.0	2	25.1		-17.3	-19.5	-32.7	17.3	+19.5	+32.7	+110.4	+111.1	+111.3	+111.4	+111.4		
64.0	1	34.6		-25.0	-25.0	-34.6	25.0	+25.0	+34.6	+33.7	+33.7	+33.7	+33.4	+33.4		

Positive is wind from the tail (210°).
Negative is wind from the head (30°).

DATA SOURCE										ANNUAL							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	8766	-18.0															
1.0	8766	-21.0	-17.2	-12.3	-10.2	-8.0		-6.2	-4.2	-3.1	-2.3	-1.9	-1.2	-1.4	-2.3	-3.0	
2.0	8766	-21.0	-18.7	-11.2	-8.9	-6.7		-3.1	-0.7	-6.5	-11.8	-15.8	-19.1	-25.8	-32.0		
3.0	8766	-26.0	-17.4	-10.4	-7.9	-5.9	-2.7	-1.3	-8.0	-14.5	-18.2	-22.1	-28.7	-40.0			
4.0	8766	-24.0	-16.0	-10.4	-8.1	-5.9	-2.4	-2.0	-9.7	-17.0	-21.2	-25.2	-34.2	-42.0			
5.0	8766	-24.0	-17.1	-10.9	-8.4	-6.1	-2.4	-2.5	-11.9	-19.7	-24.7	-29.4	-39.3	-49.0			
6.0	8766	-27.0	-18.7	-11.4	-9.0	-6.5	-2.6	-3.2	-14.4	-23.1	-28.0	-33.2	-44.5	-58.0			
7.0	8766	-28.0	-20.3	-13.0	-9.8	-7.1	-2.6	-3.8	-16.6	-26.2	-32.5	-38.6	-49.7	-66.0			
8.0	8766	-30.0	-21.5	-14.7	-10.9	-8.2	-3.3	-4.7	-18.8	-30.0	-36.7	-43.0	-57.5	-68.0			
9.0	8766	-35.0	-23.6	-16.4	-12.7	-9.5	-4.0	-5.6	-21.5	-33.8	-41.2	-47.9	-62.0	-78.0			
10.0	8766	-38.0	-29.0	-19.1	-15.1	-11.3	-4.9	-6.4	-24.4	-37.7	-44.8	-50.9	-67.5	-81.0			
11.0	8766	-47.0	-31.5	-21.6	-16.6	-12.9	-5.7	-7.2	-26.7	-40.6	-48.5	-55.6	-73.0	-94.0			
12.0	8766	-45.0	-33.3	-23.3	-18.9	-14.4	-6.5	-8.1	-28.5	-42.2	-50.2	-57.8	-73.5	-90.0			
13.0	8766	-43.0	-33.7	-24.2	-19.2	-14.9	-6.8	-8.7	-27.9	-40.3	-47.5	-54.4	-70.0	-87.0			
14.0	8766	-39.0	-31.0	-22.4	-18.4	-13.9	-6.5	-7.9	-24.9	-36.3	-42.5	-48.6	-59.3	-72.0			
15.0	8766	-30.0	-24.7	-18.6	-15.2	-11.9	-5.9	-6.3	-21.6	-31.1	-35.9	-41.0	-51.7	-64.0			
16.0	8766	-22.0	-20.1	-14.8	-12.5	-9.8	-5.2	-4.2	-18.2	-28.4	-30.8	-34.8	-43.8	-52.0			
17.0	8766	-25.0	-16.8	-12.5	-10.5	-8.6	-5.0	-2.3	-14.4	-21.5	-25.9	-29.9	-36.5	-49.0			
18.0	8766	-21.0	-15.2	-11.1	-9.7	-8.3	-5.3	-0.3	-10.1	-16.9	-20.5	-24.3	-31.0	-34.0			
19.0	8766	-22.0	-14.0	-11.4	-10.0	-8.7	-5.9	-0.5	-6.6	-12.3	-16.2	-19.9	-28.0	-36.0			
20.0	8766	-20.0	-14.7	-12.0	-10.8	-9.4	-6.7	-1.3	-4.3	-9.3	-12.6	-16.0	-22.0	-32.0			
21.0	8766	-24.0	-15.9	-12.5	-11.2	-9.8	-7.2	-2.1	-2.9	-7.4	-10.2	-13.4	-21.2	-30.0			
22.0	8766	-27.0	-16.6	-13.3	-12.0	-10.6	-7.8	-2.6	-2.5	-6.6	-9.5	-12.5	-21.3	-34.0			
23.0	8766	-23.0	-18.1	-14.3	-12.8	-11.3	-8.3	-2.9	-2.5	-6.9	-9.7	-13.0	-20.0	-32.0			
24.0	8766	-23.0	-19.0	-14.6	-13.3	-11.8	-8.8	-3.1	-3.1	-7.7	-10.8	-13.3	-19.6	-32.0			
25.0	8766	-25.0	-18.5	-15.5	-14.0	-12.5	-9.3	-3.2	-3.9	-9.0	-11.8	-14.6	-21.0	-29.0			
26.0	8766	-23.0	-18.9	-16.1	-14.7	-12.9	-9.8	-3.0	-4.5	-10.3	-13.5	-16.8	-24.2	-38.0			
27.0	8766	-29.0	-21.3	-17.0	-15.5	-13.7	-10.2	-2.8	-5.2	-11.5	-15.2	-18.9	-27.0	-35.0			
28.0	1199	-20.1	-13.7	-17.2	-15.4	-14.0	-10.4	-0.4	0.4	15.5	14.7	21.4	25.2	25.0			
29.0	1224	-24.0	-22.3	-17.1	-15.7	-13.9	-10.1	-0.6	10.4	17.1	20.4	22.4	25.4	27.4			
30.0	1246	-23.2	-21.3	-17.1	-15.4	-13.8	-10.0	-0.2	12.7	20.2	23.1	25.4	30.7	32.9			
31.0	1252	-33.2	-20.3	-17.0	-16.2	-13.7	-9.9	0.9	15.1	22.1	24.0	27.1	39.3	43.3			
32.0	1278	-23.4	-22.3	-18.0	-16.2	-14.3	-9.4	1.2	16.1	24.7	26.7	29.4	42.3	44.3			
33.0	1294	-29.5	-22.2	-18.2	-16.1	-13.9	-10.0	0.8	16.0	25.0	28.4	32.0	44.2	53.3			
34.0	1316	-31.7	-30.2	-19.2	-17.1	-14.6	-10.5	0.6	16.4	25.2	29.0	34.4	46.6	59.0			
35.0	1330	-31.5	-27.7	-21.7	-19.3	-16.4	-11.4	0.3	15.9	27.2	31.4	37.4	45.6	47.2			
36.0	1333	-35.4	-32.2	-21.3	-19.2	-16.4	-11.8	0.4	15.9	26.7	30.0	37.4	51.2	56.7			
37.0	1339	-34.4	-31.2	-23.5	-20.6	-17.9	-12.3	0.4	17.4	27.7	31.0	39.4	47.7	65.0			
38.0	1346	-32.0	-24.6	-21.4	-18.6	-12.6	-10.2	0.2	18.4	28.7	34.1	39.4	55.2	63.0			
39.0	1355	-34.2	-29.2	-24.4	-22.4	-18.4	-13.3	0.7	20.7	31.5	37.1	42.4	53.2	54.7			
40.0	1357	-32.3	-31.4	-27.2	-23.7	-20.4	-14.1	0.5	20.2	33.4	39.2	43.7	53.2	55.5			
41.0	1357	-41.1	-34.6	-28.2	-25.3	-22.2	-15.4	1.0	22.2	34.4	40.4	47.4	54.2	60.9			
42.0	1349	-46.2	-28.1	-25.4	-22.9	-15.0	-15.0	1.5	21.3	36.1	43.2	48.4	57.4	61.6			
43.0	1358	-34.5	-28.0	-27.1	-24.1	-17.2	-17.2	1.9	24.4	38.5	47.1	51.4	63.2	64.6			
44.0	1322	-35.4	-31.0	-27.7	-24.4	-17.0	-17.0	2.3	25.3	41.0	48.4	55.4	72.4	73.4			
45.0	1305	-40.7	-40.2	-31.0	-27.2	-24.0	-16.2	2.0	28.5	42.4	50.4	58.4	80.4	81.3			
46.0	1287	-39.8	-34.3	-31.7	-27.1	-23.5	-16.3	4.5	30.3	44.0	51.0	65.1	86.3	89.2			
47.0	1261	-42.4	-40.3	-32.4	-28.1	-23.4	-15.3	5.2	31.2	47.7	56.7	68.4	90.3	91.7			
48.0	1234	-40.4	-34.3	-32.0	-29.5	-24.4	-15.0	5.2	32.3	48.0	50.4	69.5	84.7	84.9			
49.0	1214	-49.5	-46.4	-34.7	-30.1	-24.4	-15.1	5.7	33.4	50.4	62.4	69.0	85.4	94.8			
50.0	1174	-54.1	-44.4	-34.4	-28.7	-24.3	-15.2	6.4	33.3	51.7	62.7	72.1	84.4	87.2			
51.0	1131	-57.2	-35.4	-28.7	-25.0	-15.3	-15.3	6.5	33.8	52.4	62.4	66.2	81.4	86.9			
52.0	1071	-67.1	-54.6	-35.1	-30.0	-25.3	-15.4	7.3	33.2	51.0	64.4	67.4	82.4	89.2			
53.0	1011	-57.9	-52.4	-36.0	-32.0	-26.5	-16.1	7.4	34.0	52.1	63.4	69.0	81.4	89.6			
54.0	924	-54.2	-52.7	-35.0	-31.0	-27.6	-16.5	7.4	34.2	52.2	65.0	72.0	84.7	94.2			
55.0	840	-47.3	-36.2	-31.7	-27.5	-17.0	-17.0	7.2	34.6	53.4	65.0	73.4	77.4	85.2			
56.0	743	-44.7	-45.7	-34.4	-29.0	-17.4	-17.4	7.0	35.6	54.4	64.4	73.4	41.0	96.5			
57.0	640	-44.6	-41.4	-34.4	-29.2	-17.4	-17.4	6.4	37.7	57.7	66.7	72.6	97.1	97.5			
58.0	515	-47.0	-39.4	-36.4	-31.1	-18.0	-18.0	7.6	36.1	56.6	67.1	71.9	92.2	92.8			
59.0	393	-62.1	-42.1	-34.1	-29.7	-19.2	-19.2	7.3	34.4	57.7	64.4	75.1	94.5	95.2			
60.0	273	-64.2	-42.3	-34.4	-32.7	-20.7	-20.7	7.3	37.3	57.4	65.0	83.3	109.5	104.9			
61.0	198	-51.5	-44.1	-38.7	-35.9	-24.3	-24.3	5.0	42.1	59.5	67.0	82.6	100.0	100.3			
62.0	124	-54.2	-52.4	-50.2	-50.2	-34.4	-24.7	4.0	30.3	59.4	70.2	82.4	111.2	111.4			
63.0	74	-70.9	-62.3	-56.2	-50.9	-34.4	-24.7	4.0	40.0	59.2	77.3	82.3	83.0	83.2			
64.0	44	-54.4	-47.6	-47.6	-47.6	-34.4	-24.7	4.4	34.2	60.4	65.0	69.4	70.0	70.1			
65.0	34	-51.1	-38.1	-23.0	-23.0	-23.0	-23.0	4.0	32.0	64.1	64.1	64.1	69.2	69.3			
66.0	24	-45.1	-41.6	-18.4	-18.4	-18.4	-18.4	2.5	35.4	51.6	56.4	56.4	56.4	56.4			
67.0	24	-87.4	-48.7	-26.0	-26.0	-26.0	-26.0	2.5	24.0	42.4	42.4	73.4	73.4	73.6			
68.0	25	-51.4	-50.6	-24.4	-24.4	-24.4	-24.4	4.5	42.4	75.4	99.4	100.0	100.4	100.4			
69.0	26	-24.3	-21.7	-17.0	-17.0	-17.0	-17.0	1.0	34.0	61.7	64.4	64.4	64.4	64.5			
70.0	25	-39.1	-36.7	-26.0	-26.0	-26.0	-26.0	0.5	35.0	70.4	84.2	84.4	84.4	84.6			

Positive is wind from the tail (210°)

Negative is wind from the head (30°)

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.1

DATA SOURCE							JANUARY	
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)	
				LATITUDE	LONGITUDE			
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956		
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1957		
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967		
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA								
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY
5FC 744	-11.0			-10.9	-9.2	-8.2	-6.8	-4.3
1.0 744	-22.0			-18.7	-16.3	-14.1	-9.1	-1.9
2.0 744	-26.0			-25.9	-21.8	-20.0	-16.9	-12.6
3.0 744	-33.0			-31.9	-26.7	-24.1	-21.4	-15.9
4.0 744	-38.0			-35.9	-31.7	-29.0	-25.3	-19.5
5.0 744	-46.0			-41.9	-37.8	-34.5	-29.1	-22.5
6.0 744	-53.0			-47.9	-42.2	-37.8	-32.4	-26.2
7.0 744	-62.0			-57.9	-46.5	-43.0	-37.3	-29.3
8.0 744	-72.0			-61.9	-52.8	-46.8	-41.2	-33.1
9.0 744	-70.0				-61.8	-53.3	-46.3	-36.7
10.0 744	-77.0			-71.9	-64.5	-58.0	-49.8	-41.0
11.0 744	-77.0			-76.9	-72.7	-63.3	-54.7	-44.5
12.0 744	-85.0			-80.9	-80.9	-64.0	-55.5	-46.4
13.0 744	-88.0			-83.9	-86.5	-61.5	-54.5	-45.1
14.0 744	-79.0			-73.9	-63.1	-57.0	-50.6	-43.0
15.0 744	-66.0				-54.6	-50.2	-45.1	-38.0
16.0 744	-58.0			-55.9	-46.2	-43.0	-38.8	-33.2
17.0 744	-48.0			-43.9	-38.6	-35.8	-32.8	-27.9
18.0 744	-39.0			-35.9	-32.6	-30.6	-26.9	-21.9
19.0 744	-42.0			-36.9	-28.5	-25.5	-21.6	-16.0
20.0 744	-36.0			-32.9	-23.5	-19.7	-16.9	-12.2
21.0 744	-28.0				-21.7	-19.4	-15.9	-10.6
22.0 744	-38.0			-32.9	-23.2	-19.2	-14.6	-9.5
23.0 744	-32.0			-30.9	-22.2	-18.3	-14.5	-8.9
24.0 744	-31.0			-28.9	-23.2	-18.5	-15.0	-9.8
25.0 744	-35.0			-28.9	-22.8	-19.8	-17.4	-11.6
26.0 744	-41.0			-36.9	-29.5	-25.2	-20.5	-14.1
27.0 744	-42.0			-31.9	-28.8	-25.7	-23.1	-16.4
28.0 105	-29.8				-26.0	-24.6	-20.0	-15.4
29.0 107	-39.0				-32.0	-29.4	-23.6	-18.4
30.0 104	-33.0				-31.4	-28.6	-22.8	-17.2
31.0 109	-39.8				-34.0	-31.1	-26.8	-20.2
32.0 113	-40.6				-39.0	-37.4	-32.7	-27.4
33.0 115	-42.8				-40.4	-39.4	-34.7	-29.7
34.0 117	-46.8				-45.4	-37.1	-36.1	-33.1
35.0 116	-42.7				-40.4	-34.8	-37.7	-33.6
36.0 116	-45.0				-43.0	-34.7	-38.4	-34.0
37.0 116	-46.3					-44.4	-37.8	-35.5
38.0 116	-46.5					-40.7	-38.9	-36.2
39.0 117	-42.4					-40.7	-38.9	-36.2
40.0 115	-43.0					-41.2	-39.3	-37.1
41.0 117	-43.3					-42.8	-40.1	-37.7
42.0 114	-42.0					-41.0	-40.4	-37.3
43.0 113	-45.6					-44.0	-42.7	-41.2
44.0 113	-44.8					-44.7	-43.2	-37.7
45.0 111	-56.7					-51.0	-46.5	-44.7
46.0 110	-57.1					-54.0	-52.5	-45.7
47.0 106	-61.4					-54.0	-50.4	-46.3
48.0 106	-65.6					-51.0	-49.4	-42.4
49.0 100	-67.1					-67.0	-47.0	-39.4
50.0 100	-67.7					-64.0	-49.7	-46.0
51.0 95	-56.9					-50.2	-49.2	-37.0
52.0 84	-62.7					-55.0	-50.3	-42.0
53.0 83	-65.4					-58.1	-50.9	-44.7
54.0 79	-69.2						-63.4	-56.7
55.0 66	-83.8						-75.4	-59.8
56.0 57	-83.0						-63.7	-52.1
57.0 46	-90.7						-84.0	-61.7
58.0 26	-105.6						-81.7	-52.0
59.0 18	-87.9							-67.1
60.0 10	-69.7							-52.4
61.0 7	-64.5							-45.0
62.0 6	-61.7							
63.0 5	-57.2							
64.0 4	-51.2							
65.0 3	-45.9							
66.0 3	-45.5							
67.0 3	-45.8							
68.0 4	-90.0							
69.0 4	-105.4							
70.0 4	-106.9							

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.2

DATA SOURCE							FEBRUARY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	18.900	PERCENTAGE FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)
5FC 678	-10.0				-9.0	-7.9	-6.8	-4.2	-0.7	-2.7	-5.1	-5.9	-6.9	-7.8	-8.0	
1.0 678	-27.0				-19.4	-17.5	-15.0	-9.3	-1.4	-3.9	-7.3	-9.8	-11.6	-12.8	-13.0	
2.0 678	-32.0				-27.1	-24.7	-20.8	-12.5	-5.3	-0.3	-4.4	-6.9	-9.4	-12.6	-13.0	
3.0 678	-41.0				-33.5	-28.5	-24.0	-16.5	-8.3	-0.9	-1.7	-3.9	-5.7	-11.0	-12.0	
4.0 678	-51.0				-41.0	-34.5	-27.1	-19.6	-10.8	-2.9	-0.9	-2.9	-6.0	-8.0	-9.0	
5.0 678	-64.0				-43.7	-39.2	-31.4	-22.7	-13.6	-4.9	-0.3	-1.9	-5.0	-9.0	-10.0	
6.0 678	-63.0				-47.0	-41.3	-34.5	-26.7	-17.0	-7.7	-1.5	-0.1	-3.6	-9.0	-10.0	
7.0 678	-71.0				-50.2	-45.7	-38.7	-27.7	-19.6	-9.0	-3.9	-0.6	-3.1	-21.0	-22.0	
8.0 678	-78.0				-56.2	-48.2	-44.2	-34.8	-22.2	-12.0	-5.1	-1.1	-5.2	-16.0	-17.0	
9.0 678	-80.0				-60.1	-53.5	-48.6	-40.0	-25.6	-13.5	-6.3	-2.2	-7.1	-17.0	-18.0	
10.0 678	-75.0				-65.4	-59.5	-53.0	-43.3	-29.4	-14.8	-8.1	-0.8	-4.0	-23.0	-24.0	
11.0 678	-77.0				-72.0	-63.1	-58.0	-46.7	-32.5	-18.2	-9.4	-3.6	-0.2	-17.0	-18.0	
12.0 678	-86.0				-73.6	-68.2	-59.7	-48.2	-34.3	-21.5	-12.7	-9.2	-2.6	-17.0	-18.0	
13.0 678	-77.0				-66.6	-61.3	-56.6	-48.0	-34.4	-22.7	-14.6	-10.7	-7.5	-1.9	-1.0	
14.0 678	-65.0				-59.7	-55.1	-50.7	-44.2	-32.2	-22.0	-14.2	-11.2	-7.7	-0.9	-0.0	
15.0 678	-67.0				-55.2	-50.1	-46.3	-38.5	-28.4	-19.4	-11.6	-9.2	-7.8	-3.9	-3.0	
16.0 678	-51.0				-47.6	-43.9	-40.0	-33.7	-24.8	-15.7	-9.7	-8.0	-6.1	-3.0	-4.0	
17.0 678	-45.0				-40.8	-38.5	-34.8	-28.0	-20.1	-12.2	-6.5	-4.2	-1.9	-0.4	-0.0	
18.0 678	-39.0				-34.2	-30.8	-27.6	-22.4	-14.3	-8.5	-3.9	-2.4	-1.4	-3.0	-4.0	
19.0 678	-22.0				-28.4	-25.5	-21.8	-16.1	-9.4	-3.9	-0.6	-0.1	-2.8	-4.5	-5.0	
20.0 678	-28.0				-21.6	-18.9	-16.4	-11.5	-5.3	-0.5	-0.7	-7.7	-12.0	-13.0	-14.0	
21.0 678	-21.0				-19.0	-16.1	-13.4	-9.3	-3.0	-0.9	-4.5	-7.1	-9.0	-13.0	-14.0	
22.0 678	-27.0				-19.0	-15.3	-12.3	-8.0	-2.1	-1.9	-6.7	-9.0	-11.4	-21.0	-22.0	
23.0 678	-21.0				-17.4	-13.7	-10.8	-6.7	-1.4	-2.8	-8.0	-9.7	-11.2	-29.0	-30.0	
24.0 678	-21.0				-16.2	-13.3	-10.6	-7.2	-2.0	-3.1	-7.9	-11.9	-16.0	-18.5	-19.0	
25.0 678	-21.0				-16.5	-13.7	-11.8	-7.9	-2.3	-3.1	-8.3	-12.6	-17.3	-26.0	-27.0	
26.0 678	-22.0				-17.0	-15.2	-13.3	-8.7	-2.8	-3.1	-10.1	-13.8	-18.2	-28.0	-29.0	
27.0 678	-22.0				-19.5	-17.7	-15.5	-9.9	-3.4	-3.9	-10.1	-15.2	-21.2	-34.0	-35.0	
28.0 82	-22.4					-17.8	-17.0	-11.7	-4.0	2.3	4.5	10.1	13.9	13.0	14.0	
29.0 82	-29.0					-27.2	-21.5	-15.4	-8.6	1.7	8.0	9.7	10.2	10.0	11.0	
30.0 81	-27.7					-27.2	-21.5	-15.4	-8.6	1.7	8.0	9.7	10.2	10.0	11.0	
31.0 81	-30.7					-27.2	-21.5	-15.4	-8.6	1.7	8.0	9.7	10.2	10.0	11.0	
32.0 81	-31.3					-27.2	-21.5	-15.4	-8.6	1.7	8.0	9.7	10.2	10.0	11.0	
33.0 84	-41.2					-31.0	-28.9	-27.2	-14.7	-2.7	9.4	12.6	13.1	13.6	13.7	
34.0 94	-34.3					-32.0	-31.6	-28.4	-19.0	-3.6	4.3	12.0	14.7	15.2	15.3	
35.0 101	-42.7				-43.0	-35.4	-34.3	-29.5	-17.7	-5.2	5.0	8.7	10.0	11.2	11.4	
36.0 102	-44.5				-41.0	-39.7	-34.6	-29.8	-14.7	-5.6	7.5	10.7	13.0	14.7	14.4	
37.0 104	-49.7				-44.0	-36.4	-35.6	-29.2	-20.2	-5.4	4.0	12.6	16.0	17.5	17.6	
38.0 107	-47.0				-41.0	-39.4	-37.6	-31.0	-21.2	-7.0	10.4	14.4	18.0	20.4	21.1	
39.0 109	-57.2				-40.0	-40.4	-38.8	-30.2	-21.4	-7.4	11.4	17.4	19.0	21.4	22.0	
40.0 102	-51.7				-41.0	-40.5	-35.9	-30.7	-21.4	-7.1	12.4	15.4	17.0	36.4	36.7	
41.0 112	-47.0				-41.0	-39.4	-38.4	-33.0	-21.0	-4.4	10.4	14.4	22.0	44.1	48.3	
42.0 109	-44.7				-43.0	-41.5	-37.3	-33.4	-21.1	-4.6	11.4	15.4	19.0	45.5	45.6	
43.0 104	-47.0				-43.0	-42.5	-40.2	-36.0	-24.0	-10.0	4.3	14.4	15.0	34.1	34.2	
44.0 104	-44.0				-44.0	-45.3	-42.7	-35.1	-24.0	-4.4	3.7	11.4	12.0	31.1	31.3	
45.0 104	-51.1				-50.0	-44.4	-46.4	-35.4	-23.0	-4.4	6.2	9.4	10.0	40.0	40.1	
46.0 102	-54.3				-50.0	-49.7	-44.9	-35.4	-24.0	-0.4	2.0	6.7	12.0	34.5	34.6	
47.0 102	-57.2				-53.0	-50.7	-49.3	-35.2	-24.7	-10.1	0.5	4.4	13.0	22.2	22.3	
48.0 94	-61.6					-55.4	-49.1	-39.4	-24.5	-11.5	-0.9	6.4	17.0	17.4	17.6	
49.0 94	-60.7					-59.4	-51.2	-43.3	-24.5	-15.0	-1.7	2.4	10.0	10.4	10.6	
50.0 90	-64.0					-53.0	-50.2	-42.6	-20.7	-15.1	-1.4					
51.0 83	-67.3					-52.4	-49.4	-44.3	-20.7	-15.5	-5.1	2.1	17.2	14.3	14.5	
52.0 80	-67.7					-55.2	-52.5	-47.3	-30.4	-14.3	-6.0	-2.4	22.3	23.1	23.3	
53.0 74	-64.1					-54.7	-56.3	-49.1	-35.2	-19.7	-10.7	-0.7	19.2	19.4	19.9	
54.0 64	-64.4					-61.4	-59.7	-50.4	-37.5	-22.5	-4.4	1.4	13.4	13.0	14.0	
55.0 60	-64.9					-62.4	-62.0	-53.4	-39.3	-24.5	-19.0	-8.0	6.3	5.4	6.6	
56.0 50	-75.3					-64.9	-63.4	-56.1	-41.0	-24.0	-16.4	-11.1	-1.4	-0.4	-0.7	
57.0 44	-77.3					-71.7	-71.7	-57.9	-43.2	-24.1	-19.2	-14.0	-8.4	-8.0	-7.9	
58.0 33	-81.0					-78.0	-71.0	-55.6	-44.2	-24.6	-13.9	-12.0	-12.6	-12.4	-12.3	
59.0 27	-104.0						-84.7	-62.7	-41.7	-25.3	-11.3	-3.4	-3.2	-3.2	-3.1	
60.0 20	-105.3						-105.0	-67.4	-43.0	-28.2	-5.0	-3.4	-3.4	-3.4	-3.1	
61.0 14	-82.5							-73.9	-54.5	-19.1	-6.5	-6.2	-6.0	-5.4	-5.4	
62.0 7	-81.6							-76.9	-60.5	-20.1	-14.1	-13.4	-13.7	-13.6	-13.6	
63.0 4	-81.2								-74.0	-25.7	-25.7	-25.1	-25.1	-25.1	-25.0	
64.0 2	-77.9								-78.0	-71.2	-71.0	-70.0	-70.0	-70.8	-70.8	
65.0 1	-62.0															
66.0 2	-56.3															
67.0 1	-51.5															
68.0 1	-106.7															
69.0 3	-94.6															
70.0 3	-126.1															

Positive is wind from the right (120°).
Negative is wind from the left (300°).

DATA SOURCE											MARCH					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		CUMULATIVE	PERCENTAGE	FREQUENCY		MAX DIR				
5FC	744	-10.0			-8.5	-7.4		-6.2	-3.7	-0.4	+2.6	+4.7	+5.6	+6.1	+8.9	+12.0
10	744	-25.0		-23.9	-19.2	-14.6		-12.7	-8.6	-1.5	+3.7	+7.0	+8.0	+10.2	+15.9	+19.0
20	744	-29.0		-26.9	-23.2	-20.7		-17.0	-12.1	-5.1	+0.0	+3.9	+5.7	+6.8	+9.4	+10.0
30	744	-38.0		-32.9	-27.6	-25.3	-21.2	-15.6	-8.1	-1.5	+1.8	+4.0	+5.8	+10.9	+16.0	
40	744	-45.0		-43.9	-32.2	-28.8	-25.8	-19.9	-11.0	-3.5	-0.2	+1.5	+3.7	+11.9	+15.0	
50	744	-48.0		-47.9	-38.2	-33.2	-30.2	-24.3	-14.2	-6.5	-2.2	-0.2	+1.8	+10.9	+13.0	
60	744	-48.0		-47.9	-41.2	-37.0	-33.9	-27.9	-17.6	-9.0	-4.1	-1.4	+0.2	+7.9	+14.0	
70	744	-55.0		-53.9	-48.2	-42.7	-38.7	-30.9	-20.6	-11.6	-5.5	-1.7	+0.2	+6.9	+13.0	
80	744	-58.0			-50.8	-47.7	-43.4	-35.2	-23.4	-13.6	-6.8	-3.9	+0.8	+6.9	+9.0	
90	744	-76.0			-69.9	-60.5	-55.0	-47.8	-40.3	-26.7	-15.2	-9.1	-5.6	+0.8	+2.9	
100	744	-109.0			-80.9	-66.5	-59.6	-53.9	-45.1	-30.0	-17.7	-8.7	-5.9	+1.2	+4.9	
110	744	-83.0			-81.9	-73.7	-65.8	-59.5	-49.2	-33.8	-19.8	-10.2	-7.7	-2.4	+0.0	
120	744	-87.0			-84.9	-77.5	-70.0	-61.3	-50.7	-35.8	-23.2	-14.4	-10.9	-8.2	+1.0	
130	744	-82.0			-80.9	-72.7	-63.5	-58.5	-48.9	-36.7	-24.2	-17.6	-13.1	-10.8	+0.0	
140	744	-75.0			-73.9	-64.5	-59.3	-54.4	-45.2	-33.9	-22.8	-16.9	-13.7	-11.8	+8.0	
150	744	-67.0			-66.9	-56.5	-52.8	-47.3	-39.8	-29.2	-20.4	-15.1	-11.7	-7.8	+1.0	
160	744	-58.0			-53.9	-48.8	-46.2	-41.1	-33.9	-25.1	-16.9	-12.0	-9.3	-6.1	+0.0	
170	744	-57.0			-46.9	-42.1	-38.3	-34.6	-28.4	-19.8	-12.4	-7.8	-6.3	-4.4	+2.0	
180	744	-56.0			-37.9	-32.3	-30.0	-27.6	-22.3	-14.1	-8.2	-4.1	-2.3	-0.6	+5.9	
190	744	-33.0			-30.9	-26.5	-24.6	-20.6	-15.4	-8.6	-3.4	-0.2	+2.2	+3.9	+8.9	
200	744	-26.0				-23.5	-20.0	-15.5	-10.5	-4.8	-0.4	+2.4	+5.6	+7.7	+13.9	
210	744	-21.0			-19.9	-16.9	-14.3	-11.3	-7.9	-2.6	+1.3	+5.4	+8.2	+10.8	+17.4	
220	744	-30.0			-28.9	-16.5	-12.7	-9.7	-6.2	-1.1	+2.5	+5.8	+8.1	+12.1	+28.9	
230	744	-27.0			-23.9	-13.6	-10.4	-8.5	-4.7	-0.5	+3.4	+6.9	+9.5	+13.5	+30.9	
240	744	-24.0			-15.9	-12.2	-10.0	-8.7	-4.9	-0.5	+3.8	+8.8	+12.0	+14.9	+31.9	
250	744	-23.0			-20.9	-17.5	-13.4	-9.7	-5.5	-0.7	+3.2	+8.9	+13.5	+19.7	+30.9	
260	744	-30.0			-28.9	-18.6	-15.2	-11.2	-6.9	-1.3	+3.1	+8.9	+15.3	+20.5	+28.9	
270	744	-30.0			-28.9	-19.1	-16.5	-12.4	-8.2	-1.9	+3.6	+10.2	+17.0	+25.7	+36.9	
280	80	-16.9				-16.0	-14.3	-10.0	-7.6	-3.5	6.3	7.4	7.7	4.0	8.0	
290	93	-14.9				-18.9	-15.3	-12.3	-8.4	-4.4	1.5	5.0	5.7	7.0	8.4	
300	97	-25.7				-21.4	-18.1	-14.6	-10.5	-6.3	1.5	5.0	5.7	7.0	8.4	
310	98	-25.3				-24.8	-20.6	-17.0	-13.0	-8.0	-0.1	4.4	5.8	7.0	8.0	
320	101	-29.4			-29.0	-26.7	-25.3	-20.0	-16.0	-10.2	5.0	6.6	7.1	7.4	9.1	
330	103	-31.9			-31.0	-27.8	-26.8	-23.7	-19.7	-10.7	2.4	7.7	9.0	19.4	19.9	
340	103	-35.4				-34.7	-30.8	-27.1	-10.6	-2.1	5.3	7.7	12.0	22.0	23.1	
350	104	-37.6			-37.6	-35.8	-33.8	-26.0	-12.1	-3.4	6.5	10.8	13.0	20.0	21.0	
360	109	-38.8			-36.0	-35.5	-31.6	-24.7	-11.1	-3.1	6.3	14.5	19.0	19.0	20.0	
370	113	-35.7			-35.4	-33.4	-28.7	-21.4	-11.2	-4.4	5.7	15.8	19.0	20.5	20.6	
380	113	-36.0			-35.0	-30.7	-28.4	-24.0	-11.1	-4.0	4.4	13.0	17.0	22.2	22.4	
390	114	-40.6			-37.0	-35.4	-30.6	-22.0	-14.7	-4.7	10.2	19.0	15.0	14.6	18.7	
400	116	-38.0			-37.8	-34.7	-30.2	-25.0	-15.0	-4.7	10.2	15.0	15.0	17.8	17.7	
410	116	-42.8			-38.8	-37.8	-33.6	-26.2	-16.6	-5.2	11.1	18.0	16.8	20.1	20.3	
420	116	-38.6			-38.5	-38.2	-34.2	-26.3	-17.0	-5.4	11.2	15.7	16.8	20.1	20.3	
430	114	-44.7			-39.0	-36.7	-32.8	-25.8	-17.2	-7.0	10.2	14.0	15.0	16.6	16.7	
440	113	-44.5			-36.0	-35.8	-34.8	-27.0	-16.0	-5.5	5.7	11.0	14.0	17.7	17.4	
450	111	-42.0				-40.8	-37.2	-27.7	-17.1	-6.6	4.2	5.7	12.0	14.6	14.8	
460	110	-40.9				-39.7	-37.2	-30.1	-17.0	-7.5	5.1	5.0	8.4	8.9	9.0	
470	104	-47.8			-44.0	-41.5	-37.4	-30.2	-19.0	-8.4	2.6	5.6	6.0	7.0	8.0	
480	107	-54.4			-43.0	-42.3	-38.6	-31.0	-21.1	-10.0	0.7	9.4	5.7	5.8	5.8	
490	106	-53.3			-43.3	-38.9	-30.9	-23.1	-11.3	-0.2	3.6	4.4	5.1	5.1	5.2	
500	102	-50.7			-45.0	-43.7	-38.7	-33.3	-24.0	-12.4	-5.0	4.7	6.0	8.4	8.7	
510	97	-48.3				-45.8	-40.1	-36.2	-25.7	-14.1	-6.9	-5.1	7.0	7.4	7.5	
520	94	-48.6				-45.0	-41.8	-37.4	-28.2	-17.0	-7.7	-7.0	4.4	4.7	4.7	
530	87	-52.8				-51.0	-45.3	-37.1	-29.1	-21.3	-9.3	-1.0	7.1	7.7	7.8	
540	80	-56.2				-48.2	-46.0	-38.4	-30.0	-20.7	-12.0	-1.0	8.2	9.1	9.2	
550	69	-55.8				-50.7	-48.6	-42.0	-31.3	-19.2	-9.4	-1.4	9.4	10.2	10.3	
560	60	-52.0					-51.0	-42.8	-31.7	-20.5	-12.0	-1.0	14.5	15.4	15.4	
570	51	-57.9			-51.8	-50.7	-44.9	-31.2	-21.1	-9.3	1.0	12.6	13.1	13.2	13.2	
580	41	-50.4				-47.5	-43.8	-32.2	-21.5	2.0	6.1	6.5	6.8	6.9	6.9	
590	32	-64.8				-49.4	-43.0	-35.3	-16.1	4.4	9.2	9.4	9.7	9.7	9.7	
600	22	-64.3				-61.9	-50.5	-33.5	-15.5	9.0	11.6	11.0	12.1	12.1	12.1	
610	14	-53.7					-62.8	-50.2	-37.7	-11.2	10.2	19.6	19.6	19.7	19.7	
620	10	-54.2					-39.7	-35.0	-24.4	-11.5	11.5	11.7	11.8	11.9	11.9	
630	7	-60.5					-42.0	-34.5	-24.1	-11.5	11.5	11.7	11.8	11.8	11.8	
640	5	-59.4					-45.5	-35.0	-24.0	-11.5	11.5	11.7	11.8	11.8	11.8	
650	3	-30.9					-39.5	-35.2	-24.0	-11.5	11.5	11.7	11.8	11.8	11.8	
660	2	-26.9					-27.0	-24.0	-11.5	-9.3	-9.2	-9.2	-9.2	-9.2	-9.2	
670	1	-15.5													-15.5	
680	1	-2.2													-2.2	
690	1	4.0													4.0	
700	1	-1.6													-1.6	

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.4

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-11.0			-6.8	-4.1	-5.0	-2.8	+0.6	+3.4	+5.1	+5.9	+6.7	+11.0	+12.0	
1.0	720	-25.0			-17.3	-14.5	-10.5	-7.0	+0.3	+5.5	+8.4	+9.6	+10.8	+15.0	+16.0	
2.0	720	-28.0			-18.9	-16.5	-13.7	-9.7	-2.5	+2.7	+6.3	+7.9	+10.4	+12.5	+13.0	
3.0	720	-38.0			-22.8	-20.7	-18.2	-13.6	-4.9	+1.4	+5.2	+6.8	+8.4	+12.5	+13.0	
4.0	720	-40.0			-26.9	-24.8	-21.1	-15.9	-7.4	-0.2	+4.2	+6.1	+8.1	+9.5	+10.0	
5.0	720	-45.0			-30.9	-27.9	-25.0	-19.0	-9.8	-1.1	+3.3	+5.6	+6.9	+10.0	+11.0	
6.0	720	-55.0			-34.7	-31.9	-28.5	-22.5	-12.8	-2.3	+2.3	+5.8	+7.5	+10.5	+11.0	
7.0	720	-58.0			-41.6	-35.6	-32.4	-25.2	-15.4	-9.0	+0.1	+4.1	+9.8	+14.5	+15.0	
8.0	720	-74.0			-50.3	-41.6	-36.5	-29.5	-18.2	-6.1	-0.5	+2.1	+8.8	+13.0	+14.0	
9.0	720	-74.0			-60.2	-48.6	-41.8	-33.1	-20.5	-7.3	-0.8	+2.5	+8.9	+14.0	+15.0	
10.0	720	-85.0			-61.3	-52.2	-46.1	-37.7	-22.8	-9.1	-2.4	+0.7	+4.8	+13.0	+14.0	
11.0	720	-82.0			-67.7	-59.3	-52.8	-42.1	-25.9	-11.0	-3.4	-0.1	+4.8	+14.0	+15.0	
12.0	720	-83.0			-68.2	-62.3	-58.1	-45.3	-29.0	-13.1	-5.1	-1.2	+1.2	+8.0	+9.0	
13.0	720	-85.0			-69.3	-62.3	-56.8	-46.7	-31.0	-16.5	-7.3	-4.4	-1.0	+3.0	+4.0	
14.0	720	-78.0			-65.7	-58.6	-51.8	-41.5	-29.2	-17.2	-9.5	-5.6	-3.0	-0.4	+0.0	
15.0	720	-64.0			-53.3	-49.9	-44.3	-35.8	-25.6	-15.3	-8.5	-5.1	-3.3	-1.4	+1.0	
16.0	720	-58.0			-46.2	-42.3	-38.0	-30.3	-20.9	-12.0	-6.3	-3.8	-2.8	+5.0	+6.0	
17.0	720	-54.0			-36.7	-32.9	-30.3	-24.3	-15.6	-8.5	-3.2	-1.6	-0.0	+6.0	+7.0	
18.0	720	-40.0			-27.5	-25.8	-22.6	-17.1	-9.9	-4.1	-0.3	+1.7	+3.9	+10.0	+11.0	
19.0	720	-31.0			-22.9	-20.7	-16.4	-10.7	-4.6	-0.2	+2.7	+4.7	+6.4	+10.0	+11.0	
20.0	720	-24.0			-17.5	-14.6	-11.4	-6.7	-1.5	+2.0	+4.7	+5.7	+8.9	+15.0	+16.0	
21.0	720	-19.0			-11.9	-10.5	-8.1	-4.3	-0.3	+3.3	+5.8	+7.3	+8.9	+15.0	+16.0	
22.0	720	-18.0			-11.1	-8.1	-5.9	-2.8	+0.7	+4.5	+7.0	+8.3	+10.2	+14.0	+15.0	
23.0	720	-23.0			-9.8	-8.4	-5.6	-2.0	+1.3	+5.1	+7.4	+8.8	+11.7	+17.0	+18.0	
24.0	720	-12.0			-10.8	-8.4	-5.7	-2.2	+1.2	+5.5	+8.0	+9.9	+12.4	+18.0	+19.0	
25.0	720	-12.0			-9.9	-8.4	-6.4	-2.9	+0.7	+5.5	+8.8	+11.3	+13.7	+20.0	+21.0	
26.0	720	-15.0			-10.1	-8.9	-7.5	-4.2	+0.2	+6.4	+9.8	+12.6	+14.2	+23.0	+24.0	
27.0	720	-16.0			-11.8	-10.7	-9.0	-5.6	-0.3	+5.9	+10.5	+13.7	+16.6	+21.5	+22.0	
28.0	94	-14.5			-12.8	-11.4	-9.4	-7.1	-0.7	+7.7	+11.4	+13.0	+20.0	+21.4	+21.4	
29.0	94	-16.6			-14.0	-13.5	-11.4	-8.8	-1.5	+6.6	+12.0	+14.7	+15.0	+16.5	+16.5	
30.0	104	-14.4			-14.0	-14.0	-11.9	-9.0	-2.4	+6.6	+10.3	+11.7	+14.0	+14.4	+14.5	
31.0	107	-23.0			-17.4	-14.9	-11.9	-8.7	-1.7	+6.6	+9.7	+10.6	+11.0	+14.5	+14.5	
32.0	106	-25.5			-18.0	-17.4	-15.6	-12.8	-4.0	+6.2	+9.0	+10.6	+11.0	+14.5	+14.5	
33.0	104	-24.7			-24.6	-18.4	-17.4	-13.2	-0.8	+6.6	+9.0	+10.6	+11.0	+14.5	+14.5	
34.0	104	-24.3			-25.0	-23.5	-21.4	-18.2	-6.5	+1.7	+6.6	+9.0	+10.6	+14.1	+14.3	
35.0	110	-34.4			-26.0	-26.2	-21.5	-16.2	-4.0	+2.1	+6.3	+9.0	+10.6	+11.4	+11.5	
36.0	112	-34.8			-30.0	-25.5	-24.1	-16.6	-6.5	+2.0	+5.0	+7.6	+9.0	+15.0	+16.2	
37.0	112	-31.8			-27.0	-24.7	-20.4	-14.6	-6.5	+2.7	+5.5	+8.4	+9.0	+10.0	+11.1	
38.0	114	-39.3			-25.0	-23.4	-20.6	-15.6	-6.4	+2.7	+6.7	+7.7	+8.0	+14.0	+14.1	
39.0	112	-27.7			-25.0	-21.5	-19.4	-14.7	-5.8	+1.4	+9.7	+11.0	+12.0	+17.4	+17.5	
40.0	112	-32.3			-28.0	-28.5	-21.7	-15.0	-7.2	+1.7	+12.4	+14.6	+15.0	+14.6	+18.7	
41.0	113	-25.1			-28.0	-23.7	-19.3	-14.0	-7.1	+5.4	+10.7	+13.0	+13.0	+15.2	+16.5	
42.0	112	-24.8			-28.7	-22.7	-21.2	-14.4	-0.0	+6.1	+10.0	+13.0	+13.0	+19.5	+19.5	
43.0	112	-30.5			-26.0	-24.5	-21.4	-15.4	-0.0	+7.4	+11.5	+12.6	+13.4	+14.2	+14.3	
44.0	111	-27.3			-26.0	-23.5	-21.7	-15.2	-1.0	+8.3	+13.5	+14.7	+15.0	+20.0	+21.1	
45.0	110	-29.5			-28.0	-26.5	-20.5	-14.5	-1.7	+10.2	+14.5	+14.0	+19.0	+20.4	+20.7	
46.0	107	-35.1			-33.0	-29.6	-20.3	-14.7	-2.4	+0.5	+13.0	+15.4	+16.0	+25.2	+25.4	
47.0	104	-34.8			-34.0	-31.6	-26.7	-16.4	-5.2	+4.1	+13.0	+15.0	+14.5	+18.0	+19.0	
48.0	103	-41.5			-37.0	-34.7	-25.4	-18.2	-8.5	+7.7	+11.0	+13.4	+15.0	+18.1	+19.3	
49.0	103	-40.9			-39.0	-37.7	-27.9	-17.8	-8.2	+7.3	+12.4	+14.7	+20.0	+24.3	+24.5	
50.0	100	-41.1			-41.0	-37.7	-30.5	-16.6	-6.0	+7.7	+13.0	+16.7	+21.0	+24.1	+24.3	
51.0	100	-39.5			-40.0	-36.4	-35.0	-17.7	-3.4	+8.4	+14.0	+19.7	+21.0	+25.2	+25.3	
52.0	94	-34.4			-36.4	-34.1	-16.2	-8.2	+0.2	+15.4	+19.0	+20.0	+21.0	+21.2	+21.2	
53.0	92	-34.1			-35.0	-31.4	-17.5	-8.0	+6.4	+14.0	+16.0	+19.1	+19.7	+19.4	+19.4	
54.0	80	-35.9			-35.0	-35.0	-19.4	-7.0	+4.7	+11.5	+14.0	+17.0	+17.7	+17.4	+17.4	
55.0	75	-35.2			-33.2	-33.2	-23.1	-7.4	+5.4	+12.4	+14.0	+20.2	+20.6	+20.7	+20.7	
56.0	64	-41.0			-34.4	-33.4	-24.0	-10.2	+5.5	+13.4	+15.4	+24.6	+25.1	+25.2	+25.2	
57.0	52	-34.7			-36.4	-30.7	-22.7	-11.5	+3.7	+0.7	+11.0	+17.7	+14.4	+14.5	+14.5	
58.0	44	-34.5			-35.0	-33.7	-24.7	-12.4	+2.2	+0.2	+8.4	+14.4	+14.4	+14.4	+14.4	
59.0	34	-30.7			-30.2	-30.2	-20.4	-12.2	+5.4	+12.4	+14.4	+16.4	+16.7	+16.0	+15.9	
60.0	25	-35.1			-30.7	-24.0	-13.5	-8.0	+0.0	+10.0	+20.4	+20.0	+21.1	+21.2	+21.0	
61.0	14	-29.9			-17.7	-17.7	-17.7	-17.7	+9.0	+14.7	+24.4	+24.0	+24.0	+25.0	+25.0	
62.0	4	-25.0			-13.0	-13.0	-13.0	-13.0	+14.4	+14.4	+14.4	+14.4	+14.4	+14.4	+14.4	
63.0	4	-14.0			-12.0	-12.0	-12.0	-12.0	+6.4	+6.4	+6.4	+6.4	+6.4	+6.4	+6.4	
64.0	4	-23.5			-12.0	-12.0	-12.0	-12.0	+5.4	+5.4	+5.4	+5.4	+5.4	+5.4	+5.4	
65.0	2	-7.7			-8.0	-8.0	-8.0	-8.0	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	
66.0	2	1.2			3.0	3.0	3.0	3.0	+16.0	+16.0	+16.0	+16.0	+16.0	+16.0	+16.0	
67.0	2	1.2			1.0	1.0	1.0	1.0	+8.0	+8.0	+8.0	+8.0	+8.0	+8.0	+8.0	
68.0	2	17.9			15.0	15.0	15.0	15.0	+24.0	+24.0	+24.0	+24.0	+24.0	+24.0	+24.0	
69.0	2	14.9			15.0	15.0	15.0	15.0	+43.0	+43.0	+43.0	+43.0	+43.0	+43.0	+43.0	
70.0	2	14.9			15.0	15.0	15.0	15.0	+43.0	+43.0	+43.0	+43.0	+43.0	+43.0	+43.0	

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.5

DATA SOURCE										MAY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	744	-9.0			-6.2	-4.2	-3.2	-1.2	+0.8	+3.5	+5.1	+5.8	+6.7	+7.9	+10.0	
1.0	744	-16.0			-11.5	-9.0	-6.8	-3.6	+0.3	+4.8	+7.3	+8.5	+9.6	+11.9	+13.0	
2.0	744	-18.0		-16.9	-14.5	-10.5	-8.3	-5.0	+0.7	+2.8	+5.6	+7.5	+9.1	+10.9	+12.0	
3.0	744	-23.0		-20.9	-15.6	-13.0	-10.4	-6.2	+1.0	+1.8	+4.8	+6.6	+8.5	+10.9	+14.0	
4.0	744	-25.0		-23.9	-18.7	-16.3	-13.1	-7.6	+1.9	+1.5	+4.4	+5.6	+6.6	+7.9	+9.0	
5.0	744	-30.0		-25.9	-21.8	-18.8	-14.7	-9.2	-3.3	+0.5	+3.9	+5.3	+6.2	+8.4	+9.0	
6.0	744	-30.0		-28.9	-23.5	-21.1	-17.8	-11.2	-4.7	-0.0	+3.3	+5.0	+6.7	+8.9	+12.0	
7.0	744	-32.0		-29.9	-25.8	-22.4	-19.5	-13.1	-6.3	-0.3	+2.9	+4.9	+7.1	+11.4	+12.0	
8.0	744	-35.0		-33.9	-28.2	-25.2	-21.9	-15.3	-7.9	-0.5	+3.0	+6.0	+7.8	+9.9	+11.0	
9.0	744	-37.0		-34.9	-30.6	-28.2	-24.9	-18.1	-9.1	-0.7	+3.1	+5.0	+8.1	+12.9	+14.0	
10.0	744	-44.0			-36.2	-32.5	-28.4	-20.6	-10.6	-1.4	+2.6	+5.5	+8.5	+15.9	+19.0	
11.0	744	-49.0		-47.9	-41.5	-37.6	-31.4	-24.1	-12.4	-2.6	+2.4	+6.0	+8.6	+13.9	+22.0	
12.0	744	-53.0		-52.9	-45.5	-39.6	-35.8	-26.8	-14.6	-4.3	+1.9	+6.0	+8.7	+14.9	+16.0	
13.0	744	-57.0		-56.9	-50.5	-43.4	-37.6	-28.9	-17.3	-5.9	-0.3	+3.7	+6.2	+13.9	+18.0	
14.0	744	-52.0		-46.9	-43.7	-40.2	-34.9	-27.2	-17.6	-7.6	-2.1	-0.2	+4.5	+9.9	+12.0	
15.0	744	-43.0		-42.9	-34.6	-31.7	-29.0	-23.0	-15.4	-7.4	-2.7	-0.6	+1.5	+6.9	+8.0	
16.0	744	-32.0		-30.9	-27.1	-24.8	-23.2	-19.2	-11.9	-5.4	-0.7	+1.1	+2.9	+5.9	+7.0	
17.0	744	-30.0		-24.9	-21.5	-19.7	-17.5	-13.5	-7.6	-2.3	-0.0	+2.0	+3.7	+7.9	+10.0	
18.0	744	-27.0		-17.9	-14.6	-13.6	-12.1	-8.8	-3.7	-0.0	+2.8	+4.5	+5.8	+12.9	+14.0	
19.0	744	-21.0		-12.9	-10.3	-9.3	-8.0	-4.9	-0.6	+2.6	+4.8	+6.0	+7.3	+9.9	+12.0	
20.0	744	-13.0		-11.9	-7.8	-6.6	-4.9	-2.2	+0.8	+4.2	+6.6	+7.7	+8.9	+10.9	+14.0	
21.0	744	-9.0		-7.9	-5.8	-4.6	-2.8	-0.8	+2.6	+5.8	+8.5	+9.8	+11.3	+14.9	+20.0	
22.0	744	-16.0		-6.9	-3.9	-2.8	-1.7	-0.3	+3.5	+7.4	+9.8	+11.3	+13.5	+20.9	+22.0	
23.0	744	-13.0		-4.9	-2.8	-2.0	-0.9	+0.1	+4.2	+8.3	+11.0	+12.4	+14.3	+17.9	+19.0	
24.0	744	-7.0		-5.9	-4.5	-2.7	-1.4	+0.5	+4.7	+8.8	+11.8	+13.4	+15.1	+16.9	+20.0	
25.0	744	-8.0		-7.9	-5.4	-3.2	-1.6	+0.1	+4.7	+9.5	+12.3	+14.2	+15.5	+16.9	+18.0	
26.0	744	-9.0			-5.7	-3.9	-2.5	+0.0	+5.0	+9.9	+12.9	+14.7	+16.5	+19.4	+20.0	
27.0	744	-10.0	-9.9		-7.3	-5.0	-3.2	-0.3	+4.4	+9.8	+13.7	+15.7	+17.2	+20.9	+22.0	
28.0	103	-11.4			-10.0	-8.7	-4.0	-1.5	5.3	12.2	17.0	18.0	20.0	20.7	20.4	
29.0	105	-15.3			-12.0	-9.6	-5.0	-2.1	4.5	12.3	17.0	19.0	21.0	24.7	24.4	
30.0	105	-15.3			-12.0	-11.6	-7.6	-3.4	5.3	13.1	16.4	19.4	20.4	21.3	21.4	
31.0	107	-17.6			-16.0	-10.4	-10.4	-6.5	4.6	11.0	14.4	16.4	17.0	21.2	21.4	
32.0	110	-15.1			-14.0	-14.2	-11.5	-6.6	3.5	11.3	15.3	15.0	17.0	22.7	22.4	
33.0	112	-13.9			-13.4	-13.2	-11.2	-5.7	4.1	10.5	14.5	16.5	17.0	23.6	23.7	
34.0	113	-13.9			-13.0	-12.4	-9.3	-6.3	3.2	10.4	15.2	17.7	18.0	24.7	24.4	
35.0	113	-11.5						-6.4	2.6	11.5	17.1	17.0	19.0	21.6	21.7	
36.0	113	-15.7			-14.0	-12.7	-9.2	-6.4	3.8	12.0	15.0	18.2	19.0	21.0	21.2	
37.0	114	-15.5			-12.0	-12.2	-9.4	-6.0	4.5	13.0	16.4	18.4	19.0	23.5	23.5	
38.0	112	-26.1			-13.0	-12.5	-9.4	-6.2	5.4	13.3	17.4	19.0	19.0	20.0	21.0	
39.0	112	-15.3			-12.7	-11.2	-1.6	6.3	13.2	19.5	20.7	21.4	22.1	22.2		
40.0	115	-15.4			-14.4	-7.2	0.1	7.5	14.7	20.1	22.4	23.4	24.4	25.0		
41.0	116	-10.9			-10.4	-5.6	2.4	9.3	16.1	22.1	23.0	25.4	25.0	26.0		
42.0	116	-10.7			-9.4	-4.4	3.6	10.5	17.4	22.1	23.0	24.4	28.0	29.0		
43.0	113	-4.2			-7.0	-6.4	-2.4	3.6	11.6	20.3	22.7	23.0	23.0	26.1	26.2	
44.0	112	-14.8			-11.0	-3.5	-0.5	4.7	13.5	22.0	24.4	25.0	26.0	28.0	29.1	
45.0	111	-9.1			-7.0	-6.5	-1.4	5.6	15.3	22.7	25.4	28.2	28.0	30.7	30.4	
46.0	104	-16.0			-6.0	-4.5	-1.3	5.4	16.0	23.3	28.4	30.4	31.0	32.7	32.4	
47.0	107	-14.0			-5.0	-3.4	-0.3	6.5	16.4	24.3	28.3	29.0	32.0	35.4		
48.0	106	-14.1			-4.0	-3.4	-0.6	4.7	16.4	24.2	28.4	29.0	30.0	36.1	35.2	
49.0	104	-12.3			-4.3	0.6	0.4	4.4	16.6	25.4	30.3	31.6	33.0	36.0	36.1	
50.0	100	-4.3			-2.7	4.5	11.0	17.3	27.1	32.0	33.0	35.0	36.0	36.0		
51.0	94	-11.7			-1.4	0.9	10.4	18.3	27.4	33.0	33.0	36.0	37.1	37.3		
52.0	95	-18.4			-4.4	-0.1	9.0	18.0	27.3	33.1	35.0	40.1	41.1	41.3		
53.0	90	-23.9			-3.0	0.7	9.1	19.3	27.5	35.5	37.0	43.1	44.1	44.3		
54.0	85	-9.0			-7.1	3.1	9.4	18.5	26.4	32.9	40.4	41.2	42.2	42.3		
55.0	74	-15.1			-0.3	3.0	9.2	18.5	29.1	34.7	40.7	41.2	41.4	41.9		
56.0	66	-7.6			-3.5	0.3	6.5	18.0	30.5	39.2	39.0	42.2	42.5	42.5		
57.0	57	-20.0			-14.7	-1.6	6.0	18.2	31.0	39.2	41.7	43.2	43.5	43.6		
58.0	43	-26.1				-16.4	-1.6	7.4	20.5	32.2	39.0	43.0	43.7	44.2		
59.0	33	-11.2					4.2	16.5	24.4	36.4	40.2	40.5	40.7	40.7		
60.0	20	-12.6				-13.0	-5.0	15.0	36.4	38.0	41.4	41.7	41.4	41.4		
61.0	12	-1.8					-0.5	12.0	34.1	42.4	43.0	43.3	43.4	43.4		
62.0	4	5.7					11.4	21.5	29.6	41.5	41.4	41.4	41.4	42.0	42.0	
63.0	2	11.2						11.0	34.3	34.5	34.6	34.6	34.6	34.5		
64.0	2	16.7						17.0	33.0	33.3	33.0	33.4	33.5	33.5		
65.0	2	22.1						22.0	24.0	24.3	24.0	24.5	24.5	24.5		
66.0	1	22.9												22.9		
67.0	1	27.6												27.6		
68.0	1	30.8												30.8		
69.0	1	30.9												30.9		
70.0	1	41.1												41.1		

Positive is wind from the right (120°).
Negative is wind from the left (300°).

DATA SOURCE										JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	18.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-5.0			-4.8	-4.1	-2.4	-0.9	+0.1	+3.1	+4.9	+5.8	+6.8	+9.0	+10.0	
1.0	720	-15.0			-10.7	-7.8	-4.4	-3.5	+0.0	+3.6	+5.8	+7.1	+8.5	+24.0	+25.0	
2.0	720	-21.0			-11.5	-9.3	-7.0	-4.6	+0.7	+2.4	+4.8	+5.9	+7.9	+21.0	+22.0	
3.0	720	-19.0			-11.9	-10.5	-8.7	-4.9	+0.9	+1.7	+4.2	+5.9	+7.9	+18.0	+19.0	
4.0	720	-19.0			-14.2	-12.0	-9.7	-5.7	+1.2	+1.5	+4.1	+5.5	+6.4	+18.0	+19.0	
5.0	720	-20.0			-13.9	-12.4	-10.2	-6.7	+1.7	+1.6	+4.0	+5.2	+7.4	+14.0	+15.0	
6.0	720	-18.0			-15.7	-13.1	-11.3	-7.1	+2.2	+1.4	+4.4	+5.7	+7.9	+12.0	+13.0	
7.0	720	-22.0			-17.7	-15.6	-12.7	-8.3	+2.7	+1.3	+4.5	+5.7	+7.9	+14.0	+15.0	
8.0	720	-24.0			-21.3	-17.7	-14.7	-9.1	+3.0	+1.3	+5.0	+6.7	+8.4	+12.0	+13.0	
9.0	720	-32.0			-24.7	-19.9	-17.0	-10.8	+3.7	+1.8	+5.5	+7.9	+9.9	+14.0	+15.0	
10.0	720	-36.0			-28.8	-22.9	-19.0	-12.5	+4.3	+2.2	+7.0	+9.6	+11.8	+17.0	+18.0	
11.0	720	-38.0			-32.7	-27.6	-22.2	-14.4	+4.9	+2.3	+7.4	+10.7	+14.9	+19.0	+20.0	
12.0	720	-41.0			-36.1	-33.6	-26.1	-17.4	+6.1	+1.6	+8.3	+12.5	+14.9	+24.0	+25.0	
13.0	720	-46.0			-39.2	-33.7	-28.7	-18.9	+7.3	+0.5	+7.8	+11.6	+15.6	+24.0	+25.0	
14.0	720	-48.0			-34.1	-31.3	-26.0	-18.8	+7.1	+0.0	+6.8	+11.2	+14.9	+20.0	+21.0	
15.0	720	-32.0			-27.9	-24.9	-22.1	-15.0	+5.9	+0.0	+6.1	+10.9	+12.9	+22.0	+23.0	
16.0	720	-20.0			-18.9	-16.9	-14.7	-9.4	+3.2	+1.7	+6.2	+8.5	+9.8	+19.0	+20.0	
17.0	720	-15.0			-10.7	-9.7	-8.2	-5.0	+0.6	+3.3	+6.8	+8.4	+9.9	+15.0	+16.0	
18.0	720	-9.0			-5.8	-4.8	-3.9	-1.4	+1.8	+5.5	+7.8	+9.6	+10.7	+15.0	+16.0	
19.0	720	-6.0			-3.2	-1.6	-0.7	+0.7	+6.2	+7.5	+9.8	+11.0	+11.7	+14.0	+15.0	
20.0	720	-7.0			+0.8	+0.0	+0.7	+2.4	+5.8	+9.4	+11.5	+12.8	+15.2	+20.0	+21.0	
21.0	720	-4.0			+0.8	+0.0	+1.3	+3.7	+7.4	+10.9	+13.1	+14.6	+16.4	+21.0	+22.0	
22.0	720	-4.0			+0.4	+0.8	+2.2	+5.1	+8.6	+12.3	+14.7	+16.0	+16.8	+19.0	+20.0	
23.0	720	-8.0			+0.1	+1.9	+3.6	+6.0	+9.8	+13.3	+15.4	+16.7	+18.3	+21.0	+22.0	
24.0	720	-4.0			+0.6	+2.0	+3.7	+6.3	+10.3	+14.1	+16.5	+17.8	+18.8	+22.0	+23.0	
25.0	720	-3.0			+0.5	+2.1	+4.0	+6.4	+10.9	+15.1	+17.4	+18.6	+19.8	+23.5	+24.0	
26.0	720	+0.0			+0.7	+2.4	+3.7	+6.5	+11.0	+15.6	+18.0	+19.1	+21.1	+29.0	+30.0	
27.0	720	+2.0			+0.2	+1.6	+3.5	+6.1	+11.3	+15.8	+19.2	+20.6	+21.6	+24.0	+25.0	
28.0	103	+0.9			+0.2	0.2	2.0	6.7	12.4	17.1	19.4	22.7	23.5	24.0	24.1	
29.0	104	+2.0			-1.6	-1.6	2.2	7.1	12.4	17.5	20.4	22.4	24.4	24.4	24.3	
30.0	107	+1.6			-1.6	-0.6	2.5	7.4	11.2	17.6	22.1	23.6	24.0	24.5	26.5	
31.0	108	+0.7			1.1	2.1	2.8	6.7	13.4	18.4	23.5	24.5	25.0	24.0	24.1	
32.0	109	+0.9			+0.0	0.2	3.4	7.1	13.0	18.1	21.4	23.4	24.0	30.7	30.4	
33.0	109	+0.3			0.1	2.2	3.7	6.1	13.2	18.5	22.4	24.0	25.0	29.0	29.1	
34.0	110	-7.1			+0.0	0.5	3.3	6.8	13.4	20.7	23.5	25.2	25.0	26.6	26.4	
35.0	111	-0.5			0.5	0.5	3.4	7.0	13.7	20.3	25.2	28.2	28.2	30.0	30.2	
36.0	111	1.4			1.5	1.5	4.3	9.3	15.4	21.7	27.2	28.4	29.2	33.0	33.1	
37.0	110	+2.9			3.1	3.1	6.5	10.4	17.4	24.3	29.4	29.4	30.0	34.1	34.2	
38.0	110	4.1			5.1	6.5	4.4	12.2	18.1	26.4	29.4	31.7	32.0	34.2	34.4	
39.0	110	4.0			7.1	8.5	10.8	14.2	19.2	26.0	29.4	33.5	36.4	36.4	36.2	
40.0	110	4.4			9.4	9.4	11.5	15.7	20.4	27.6	31.3	33.0	34.0	34.7	34.4	
41.0	110	4.8			7.1	7.5	13.3	17.1	23.2	29.5	33.5	36.4	38.0	39.4	39.4	
42.0	109	11.0			11.1	13.2	14.2	19.1	23.0	31.0	35.4	40.4	41.0	42.9	43.1	
43.0	109	13.1			13.2	15.7	20.5	26.6	34.0	37.4	40.4	41.0	41.0	43.2	43.4	
44.0	109	17.4			17.5	19.5	21.8	28.4	36.4	39.4	42.4	43.4	43.4	44.2	44.3	
45.0	109	16.9			17.5	19.4	23.3	31.1	37.7	41.0	44.4	44.4	44.4	51.4	52.1	
46.0	104	14.1			19.0	19.5	20.7	25.4	33.0	40.2	43.4	48.4	52.0	53.4	53.9	
47.0	107	14.0			14.1	14.4	21.7	26.5	35.1	41.2	46.7	44.0	50.0	52.0	52.2	
48.0	101	14.2			19.0	21.1	23.1	27.0	36.4	43.7	48.7	50.4	51.0	53.4	53.5	
49.0	101	16.1			16.0	19.3	23.0	29.0	37.3	45.4	51.0	53.7	55.7	56.3	56.4	
50.0	99	14.8			21.1	22.8	27.0	36.4	45.7	51.7	53.0	56.7	56.7	57.2	57.3	
51.0	89	10.0			20.0	22.5	25.4	37.4	46.2	53.4	57.0	61.1	64.6	64.6	64.6	
52.0	90	14.9			19.4	20.5	27.3	37.5	47.7	54.0	62.2	64.2	65.1	65.2	65.2	
53.0	75	14.5			19.7	20.6	27.7	37.7	48.0	54.3	64.4	74.3	74.0	74.0	74.0	
54.0	73	8.4			14.7	21.7	28.4	38.4	48.4	53.7	54.4	60.3	61.1	61.2	61.2	
55.0	70	+2.4			17.4	20.5	29.5	40.5	48.4	52.5	55.0	60.4	61.1	61.2	61.2	
56.0	66	10.1			19.3	20.3	30.5	39.3	48.4	56.7	54.4	59.4	59.4	59.3	59.3	
57.0	62	+5.7			18.1	18.7	23.4	37.0	48.4	57.0	54.4	61.4	62.3	62.4	62.4	
58.0	52	-16.6			4.2	9.4	27.3	37.0	48.4	59.4	59.4	62.3	62.3	62.5	62.5	
59.0	40	-21.8				-1.0	19.3	34.0	47.7	52.0	57.1	57.4	57.0	59.0	59.0	
60.0	31	-2.2				23.3	27.5	34.5	44.1	55.5	67.2	67.4	67.4	67.4	67.7	
61.0	23	-1.2				4.2	18.6	40.5	56.4	60.0	71.4	71.4	71.4	71.4	71.4	
62.0	14	-4.9					10.2	32.0	66.4	72.2	72.4	72.5	72.5	72.5	72.6	
63.0	6	11.9						43.0	69.1	68.7	68.0	69.0	69.0	69.1	69.1	
64.0	2	41.6						42.0	52.4	53.1	53.0	53.2	53.2	53.2	53.2	
65.0	2	40.8						41.0	61.7	62.0	62.0	62.0	62.1	62.1	62.1	
66.0	1	40.3													40.3	
67.0	1	34.3													34.3	
68.0	1	34.2													34.2	

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.7

DATA SOURCE							JULY								
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY							
							5.000	15.900 50.000 84.100 95.000 97.720 99.000 99.865 MAX DIR (DEG)							
5FC	744	-8.0		-6.9	-5.3	-3.8	-2.1	-0.9	+0.0	+2.8	+4.2	+5.0	+5.7	+7.6	+8.0
1.0	744	-14.0		-12.9	-10.6	-8.1	-6.5	-3.3	-0.1	+3.6	+6.4	+8.1	+9.8	+11.9	+13.0
2.0	744	-15.0		-13.9	-9.7	-8.2	-6.8	-3.9	-0.6	+2.5	+5.7	+7.3	+9.7	+14.9	+17.0
3.0	744	-16.0		-12.9	-10.5	-9.0	-7.5	-4.2	-0.7	+2.1	+5.5	+7.2	+8.6	+10.9	+15.0
4.0	744	-15.0		-14.9	-12.5	-10.2	-8.0	-4.6	-0.6	+2.3	+5.4	+6.9	+8.3	+10.9	+13.0
5.0	744	-17.0		-16.9	-12.5	-10.0	-8.3	-4.9	-0.7	+2.7	+5.4	+7.0	+8.1	+9.9	+11.0
6.0	744	-17.0			-13.2	-10.4	-7.8	-5.1	-0.6	+3.0	+5.5	+7.0	+9.3	+11.9	+20.0
7.0	744	-18.0		-17.9	-10.9	-9.8	-7.8	-4.9	-0.5	+3.3	+6.4	+8.2	+9.7	+10.9	+13.0
8.0	744	-17.0		-16.9	-11.6	-10.0	-7.7	-4.6	-0.5	+3.6	+6.9	+9.0	+11.1	+13.9	+15.0
9.0	744	-17.0			-12.1	-10.5	-8.5	-4.9	-0.5	+4.4	+8.3	+11.3	+13.3	+17.9	+23.0
10.0	744	-17.0			-14.1	-11.3	-8.5	-5.2	-0.6	+4.8	+9.7	+12.5	+14.5	+23.9	+30.0
11.0	744	-21.0		-19.9	-14.5	-12.6	-10.1	-6.2	-0.5	+5.3	+10.8	+14.4	+18.5	+28.9	+32.0
12.0	744	-20.0			-17.1	-14.0	-11.4	-6.8	-0.6	+6.6	+13.2	+18.5	+21.2	+32.9	+34.0
13.0	744	-22.0			-19.2	-15.3	-12.4	-7.8	-0.6	+7.7	+14.1	+19.3	+22.5	+33.9	+41.0
14.0	744	-21.0		-20.9	-16.3	-13.6	-11.0	-6.5	-0.3	+7.1	+12.3	+17.0	+19.7	+24.9	+28.0
15.0	744	-13.0		-11.9	-10.1	-8.7	-6.8	-3.6	+0.9	+6.3	+10.1	+12.6	+15.2	+20.4	+21.0
16.0	744	-7.0		-6.9	-5.6	-4.7	-3.4	-1.0	+2.1	+6.1	+8.5	+10.4	+11.9	+14.4	+15.0
17.0	744	-5.0		-4.9	-2.9	-1.9	-1.1	+0.2	+3.5	+6.7	+8.7	+9.8	+10.7	+12.9	+14.0
18.0	744	-2.0			+0.8	+0.3	+1.0	+2.7	+5.5	+8.4	+10.5	+11.7	+13.1	+15.4	+16.0
19.0	744	+1.0		+1.0	+1.5	+2.2	+3.3	+5.1	+7.7	+10.3	+11.9	+13.0	+13.9	+14.9	+18.0
20.0	744	+1.0			+1.6	+2.9	+4.6	+6.6	+9.7	+13.0	+15.1	+16.0	+17.2	+21.9	+23.0
21.0	744	+2.0		+2.0	+3.5	+4.7	+5.8	+8.0	+11.5	+15.3	+17.8	+19.3	+20.5	+23.9	+29.0
22.0	744	+10.0		+3.0	+5.8	+6.8	+7.9	+9.6	+12.7	+16.5	+19.0	+20.5	+22.1	+24.9	+27.0
23.0	744	+5.0			+6.4	+7.5	+8.7	+10.7	+13.9	+17.5	+19.7	+21.0	+22.6	+24.9	+28.0
24.0	744	+5.0		+2.0	+7.4	+8.4	+9.6	+11.7	+14.8	+18.3	+21.7	+23.1	+24.8	+27.4	+28.0
25.0	744	+6.0			+7.2	+8.2	+9.5	+12.0	+15.5	+18.8	+22.1	+23.1	+24.5	+25.8	+30.9
26.0	744	+7.0		+4.0	+7.0	+7.7	+9.2	+11.6	+14.0	+17.8	+22.9	+24.5	+25.8	+30.9	+32.0
27.0	744	+3.0			+6.2	+7.6	+8.9	+11.6	+14.2	+20.8	+23.6	+25.4	+27.3	+29.9	+33.0
28.0	105	7.4			7.4	7.7	9.4	12.7	16.5	21.4	24.3	25.3	26.0	27.2	27.3
29.0	104	9.4			9.4	9.7	11.2	14.0	18.3	22.4	25.3	27.0	28.0	31.7	31.9
30.0	111	9.9			10.0	10.4	11.1	14.1	19.2	22.0	26.2	28.0	28.0	36.2	36.4
31.0	112	10.0			10.1	10.7	11.2	14.0	19.5	22.0	25.4	28.0	28.0	33.5	33.5
32.0	113	9.7			10.1	11.2	12.3	14.8	20.1	24.4	27.4	28.0	32.4	33.5	33.4
33.0	117	1.5			9.2	10.7	13.2	15.3	19.9	24.5	27.4	31.7	35.4	37.4	39.0
34.0	121	10.8			11.0	11.3	11.4	14.0	20.0	24.5	30.0	31.7	32.4	35.0	35.2
35.0	122	10.9				12.4	13.7	16.4	22.0	24.0	32.0	33.7	35.4	37.4	37.9
36.0	122	9.9			11.2	12.4	14.7	18.2	24.6	29.1	31.5	33.1	33.0	37.4	37.9
37.0	122	12.3			13.2	14.4	16.4	20.1	25.2	30.1	32.0	33.6	34.4	41.0	41.2
38.0	124	-30.7			12.2	13.4	15.1	20.3	24.9	31.7	34.6	37.2	38.4	41.0	42.1
39.0	125	1.4			11.3	13.4	17.4	23.0	28.0	34.0	36.2	36.0	39.5	40.3	40.4
40.0	125	16.4			13.1	14.6	20.3	24.1	29.2	34.6	36.0	38.1	38.0	39.4	39.9
41.0	125	15.2				15.4	21.0	23.8	30.3	35.4	36.0	41.4	42.1	42.4	42.4
42.0	124	12.5			13.2	14.8	22.7	26.3	31.5	37.0	41.4	43.1	43.0	44.7	44.7
43.0	124	14.3			14.4	16.0	22.6	27.3	34.4	39.7	45.9	47.9	49.4	52.9	52.9
44.0	122	15.7			14.2	20.4	24.5	29.3	37.3	43.4	47.5	49.4	51.4	53.1	53.1
45.0	121	20.7				22.4	25.4	29.6	39.4	46.4	51.0	52.4	54.4	61.1	61.3
46.0	119	17.4			14.2	25.7	27.4	34.3	42.2	49.3	55.0	55.0	57.4	59.4	59.7
47.0	114	16.7			17.2	14.7	29.6	35.2	42.4	51.4	55.7	58.4	59.0	63.4	63.4
48.0	117	16.0			17.1	17.4	29.9	37.1	43.7	52.4	56.7	57.0	58.4	60.2	60.4
49.0	115	19.7				25.4	34.2	38.4	44.9	53.5	58.1	58.4	59.2	63.4	63.4
50.0	113	22.2			24.1	25.4	33.3	38.4	46.3	54.5	58.1	59.0	61.0	65.4	65.7
51.0	110	22.2			23.1	24.5	30.5	38.2	46.0	54.0	60.5	62.7	63.2	65.1	65.3
52.0	104	19.3			20.0	20.7	26.4	35.4	47.0	55.7	60.4	64.4	65.4	66.4	66.4
53.0	103	19.7				22.6	34.1	44.3	55.6	62.0	65.4	67.0	67.4	67.4	67.9
54.0	97	4.7				23.9	33.4	45.4	54.9	63.2	65.4	69.0	69.4	69.4	69.9
55.0	89	2.4			14.0	20.5	31.4	45.0	54.7	61.4	65.4	69.1	70.0	70.2	70.2
56.0	84	1.1				5.0	17.2	29.3	44.5	54.4	58.4	63.1	64.2	64.0	64.0
57.0	77	4.5				5.4	0.4	31.1	47.4	54.6	61.4	64.2	67.2	67.7	67.7
58.0	64	-0.8				7.5	14.3	28.4	43.0	54.5	62.7	67.4	69.4	69.4	69.4
59.0	56	4.0				9.3	10.4	23.0	39.0	57.1	68.2	67.4	69.4	69.4	69.4
60.0	41	-14.6				0.5	22.4	46.3	59.7	70.0	71.1	71.4	72.0	72.0	72.0
61.0	25	-47.6				9.3	32.5	53.5	64.0	72.4	74.3	74.5	74.7	74.7	74.7
62.0	14	-16.7					27.0	52.5	57.4	74.1	74.7	74.7	74.7	74.7	74.7
63.0	11	24.5					41.7	55.5	64.3	69.4	70.0	70.1	70.3	70.3	70.3
64.0	9	14.1					25.4	50.5	62.4	68.4	68.0	69.0	69.1	69.1	69.1
65.0	3	22.8					34.4	47.3	50.4	66.3	66.4	66.4	66.4	66.4	66.4
66.0	3	19.3						34.3	72.2	72.7	72.7	72.7	72.7	72.7	72.7
67.0	4	22.8						58.0	70.4	79.4	80.1	80.1	80.2	80.2	80.2
68.0	5	5.7						39.5	51.2	51.4	51.7	51.7	51.7	51.7	51.7
69.0	5	4.1						22.5	42.9	43.2	43.3	43.4	43.4	43.4	43.4
70.0	5	15.0						29.5	33.1	33.4	33.4	33.4	33.4	33.4	33.4

Positive is wind from the right (120°).
Negative is wind from the left (300°).

DATA SOURCE										AUGUST									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)												
				LATITUDE	LONGITUDE														
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967													
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967													
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																			
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)				
5FC	744	-4.0			-4.8	-3.8	-2.5	-0.9	-0.1	+1.8	+3.3	+4.1	+4.8	+6.9	+9.0				
1.0	744	-10.0			-8.7	-7.2	-6.2	-3.2	-0.0	+3.7	+5.6	+6.8	+8.5	+12.9	+19.0				
2.0	744	-12.0		-11.9	-8.1	-6.8	-5.8	-3.6	-0.4	+2.7	+4.9	+5.8	+7.5	+14.9	+21.0				
3.0	744	-12.0		-11.9	-8.8	-7.7	-6.2	-3.9	-0.6	+2.8	+5.0	+6.3	+7.5	+13.9	+22.0				
4.0	744	-12.0		-11.9	-8.6	-7.5	-6.4	-4.0	-0.6	+2.8	+5.2	+6.8	+7.9	+12.9	+23.0				
5.0	744	-15.0		-12.9	-9.4	-8.4	-6.8	-4.5	-0.7	+3.0	+5.6	+7.0	+8.8	+16.9	+21.0				
6.0	744	-16.0		-13.9	-10.3	-8.8	-7.2	-4.5	-0.6	+3.0	+5.4	+6.6	+8.3	+15.9	+17.0				
7.0	744	-19.0		-12.9	-9.8	-8.5	-6.9	-4.3	-0.5	+3.1	+5.7	+7.0	+9.1	+11.9	+13.0				
8.0	744	-19.0		-15.9	-12.3	-9.6	-7.1	-4.4	-0.5	+3.4	+5.9	+7.8	+9.8	+12.4	+13.0				
9.0	744	-15.0		-14.9	-12.5	-9.5	-7.5	-5.0	-0.5	+3.5	+6.7	+8.5	+10.6	+13.9	+15.0				
10.0	744	-17.0		-16.9	-11.7	-10.3	-8.7	-5.5	-0.8	+4.4	+7.8	+9.6	+11.7	+14.9	+16.0				
11.0	744	-19.0		-17.9	-13.9	-12.5	-9.6	-6.3	-0.7	+5.2	+9.4	+12.7	+13.8	+17.9	+23.0				
12.0	744	-17.0			-15.1	-13.2	-11.2	-7.1	-1.2	+5.9	+11.5	+14.0	+15.5	+18.9	+24.0				
13.0	744	-21.0		-20.9	-16.6	-14.8	-11.6	-7.8	-1.4	+5.7	+10.9	+14.4	+16.2	+19.9	+22.0				
14.0	744	-16.0			-13.9	-12.7	-10.7	-6.6	-1.1	+5.1	+9.8	+11.9	+13.5	+16.9	+24.0				
15.0	744	-14.0		-12.9	-9.7	-8.5	-7.1	-4.2	-0.1	+4.9	+8.0	+10.0	+11.7	+18.9	+20.0				
16.0	744	-9.0		-8.9	-6.8	-5.8	-4.4	-1.1	+1.5	+5.0	+6.9	+8.2	+9.3	+12.9	+14.0				
17.0	744	-5.0		-4.9	-3.3	-2.2	-1.2	-0.1	+3.5	+6.4	+8.5	+10.0	+11.3	+12.9	+17.0				
18.0	744	-3.0		-2.9	-0.7	-0.3	-0.3	-2.4	+5.5	+8.5	+10.1	+10.9	+12.2	+14.9	+16.0				
19.0	744	+1.0			+1.3	+2.1	+3.0	+4.9	+7.7	+10.4	+12.6	+13.6	+14.6	+16.9	+20.0				
20.0	744	+2.0			+2.3	+3.4	+4.7	+6.9	+9.9	+12.9	+15.3	+16.5	+17.9	+20.9	+24.0				
21.0	744	+3.0			+4.6	+5.4	+6.2	+8.2	+11.5	+14.8	+17.3	+18.0	+19.4	+21.9	+24.0				
22.0	744	+3.0		+4.0	+5.6	+6.6	+8.0	+9.5	+12.8	+16.4	+18.3	+19.3	+20.7	+23.9	+24.0				
23.0	744	+3.0		+3.0	+6.5	+7.5	+8.9	+10.8	+13.8	+17.2	+19.2	+20.2	+21.2	+24.9	+24.0				
24.0	744	+4.0		+4.0	+7.0	+8.1	+9.2	+11.3	+14.6	+18.1	+20.3	+21.3	+22.2	+25.9	+24.0				
25.0	744	+7.0			+7.5	+8.4	+9.5	+11.7	+15.1	+18.8	+21.8	+23.3	+24.4	+26.9	+33.0				
26.0	744	+2.0		+3.0	+7.0	+8.1	+9.1	+11.7	+15.3	+19.2	+22.2	+24.6	+25.9	+27.9	+30.0				
27.0	744	+5.0		+5.0	+7.2	+8.4	+9.5	+11.8	+15.7	+20.1	+22.8	+24.6	+26.6	+33.9	+37.0				
28.0	110	6.8			8.1	9.1	11.1	13.0	17.1	20.7	24.4	25.0	26.0	28.0	28.4				
29.0	113	9.4			8.4	9.4	11.1	14.7	18.3	21.6	24.8	26.4	27.0	28.0	31.0				
30.0	113	6.2			10.1	10.4	11.7	14.7	18.4	22.0	24.9	27.0	28.0	31.0	31.0				
31.0	115	9.8			11.1	11.5	12.4	15.0	19.1	24.5	27.1	29.0	30.4	31.7	31.9				
32.0	115	9.9			10.1	10.4	11.9	14.5	18.7	24.5	28.1	29.0	31.0	31.7	31.9				
33.0	115	9.5			9.2	10.2	11.8	15.0	19.4	24.7	27.5	29.0	30.4	31.7	31.9				
34.0	117	5.5			9.2	11.3	12.4	15.3	19.4	25.5	29.4	30.7	35.4	39.1	39.3				
35.0	118	0.0			2.2	5.7	9.6	14.4	20.3	27.3	30.0	31.3	33.4	35.5	35.4				
36.0	118	-16.2			-0.4	8.3	10.5	15.3	21.3	27.6	31.1	33.4	33.0	36.5	36.6				
37.0	120	-4.7			4.2	4.2	11.0	14.6	22.2	27.6	32.7	34.1	34.0	35.6	35.7				
38.0	120	-17.3			5.2	6.4	7.7	16.0	23.1	29.3	33.4	35.1	35.0	35.6	36.4				
39.0	120	2.2			2.2	4.7	9.0	15.7	22.4	30.0	35.0	38.1	39.7	39.2	39.2				
40.0	119	5.9			7.2	8.2	11.0	15.4	23.1	31.1	37.0	39.4	40.4	46.4	47.0				
41.0	117	7.2			7.2	7.7	12.0	15.4	23.9	31.0	37.1	39.7	40.8	42.0	42.1				
42.0	117	-26.8			7.2	11.7	14.4	17.6	25.0	32.1	37.1	40.2	43.6	43.7	43.7				
43.0	117	4.5			9.2	11.3	12.9	20.9	27.9	34.0	40.4	43.4	44.0	47.2	47.4				
44.0	115	-1.4			4.2	6.6	12.6	19.4	30.0	34.4	42.0	45.0	46.0	48.6	48.7				
45.0	114	4.2			10.1	10.4	12.9	19.4	31.0	41.2	46.7	51.0	52.0	54.0	54.2				
46.0	113	7.9			8.4	8.4	12.7	20.4	31.4	41.5	44.2	50.7	57.0	60.7	60.9				
47.0	110	7.6			10.0	10.4	11.5	20.6	31.3	41.4	50.4	54.0	59.0	62.0	62.4				
48.0	110	0.0			8.1	11.5	13.5	22.4	31.5	42.9	47.5	50.0	53.0	60.7	60.4				
49.0	104	5.5			6.1	8.4	11.2	21.3	31.0	41.4	49.1	50.0	51.0	56.2	56.5				
50.0	105	5.6				8.4	13.3	20.3	30.1	42.9	47.4	51.4	55.0	56.4	57.0				
51.0	105	-4.2			-1.0	8.4	14.3	19.7	30.7	43.2	51.4	57.4	59.0	59.7	59.4				
52.0	98	-75.9			7.2	12.9	19.4	30.1	44.2	52.4	53.4	60.0	61.3	61.5	61.5				
53.0	96	-0.1			7.2	11.4	16.4	24.0	40.0	46.4	48.0	67.1	68.3	69.5	69.5				
54.0	91	-10.4			-3.0	4.5	15.7	20.3	40.5	47.2	48.0	64.1	65.3	65.5	65.5				
55.0	83	-13.7			-13.1	0.1	12.2	27.4	39.0	44.0	49.1	60.2	61.1	91.1	91.3				
56.0	75	-16.1			-9.3	-4.2	4.0	25.2	38.1	49.4	54.4	64.1	65.0	65.1	65.1				
57.0	61	-18.1			-16.4	-5.0	5.7	21.2	41.3	50.0	55.4	60.1	60.7	60.4	60.4				
58.0	48	-27.3			-26.0	-10.6	2.3	14.0	39.4	59.4	61.7	62.3	62.3	62.4	62.4				
59.0	37	-29.2				-24.1	-8.1	17.4	33.1	59.2	61.0	61.7	62.0	62.1	62.1				
60.0	27	-24.9				-24.6	-0.4	24.3	38.7	56.7	60.6	60.0	61.2	61.2	61.2				
61.0	27	-26.4				-20.6	-4.7	17.5	32.9	64.7	71.4	71.4	71.4	71.4	71.4				
62.0	19	-15.4					-4.0	14.5	35.0	60.0	60.4	60.4	60.4	60.4	60.4				
63.0	16	-10.4					-8.5	11.0	40.5	58.2	58.7	58.0	59.0	59.0	59.0				
64.0	10	-17.3					-6.4	19.0	35.4	39.4	39.4	39.4	39.7	39.7	39.7				
65.0	8	-4.5					12.3	14.0	29.7	32.4	32.4	32.7	32.7	32.7	32.7				
66.0	7	1.9					8.1	14.5	37.0	47.4	48.1	48.2	48.1	48.1	48.3				
67.0	6	0.8						25.0	45.1	45.0	46.1	46.2	46.3	46.3	46.3				
68.0	5	3.7						15.4	30.2	30.7	30.4	30.0	30.0	30.0	30.0				
69.0	4	16.2						17.0	21.5	22.2	22.3	22.4	22.4	22.5	22.5				
70.0	4	6.6						13.0	25.5	26.1	26.2	26.1	26.1	26.4	26.4				

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH

TABLE 3.9

DATA SOURCE										SEPTEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	PERCENTAGE FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	+11.0			-5.8	-3.8	-2.7	-1.1	+0.2	+2.7	+4.3	+5.2	+5.9	+11.0	+12.0		
1.0	720	-31.0			-12.2	-8.5	-6.5	-2.2	+1.2	+5.3	+8.0	+9.2	+11.9	+31.0	+32.0		
2.0	720	-28.0			-12.3	-9.6	-7.2	-3.7	-0.0	+4.3	+7.5	+9.1	+13.4	+33.0	+34.0		
3.0	720	-28.0			-12.5	-11.1	-7.8	-4.3	-0.4	+3.6	+6.8	+8.5	+11.8	+32.0	+33.0		
4.0	720	-25.0			-11.9	-10.3	-8.3	-5.2	-0.6	+2.9	+6.2	+7.8	+10.9	+27.0	+28.0		
5.0	720	-24.0			-12.4	-10.7	-8.8	-5.4	-0.9	+3.0	+6.2	+7.5	+10.8	+22.0	+23.0		
6.0	720	-23.0			-12.5	-10.6	-9.0	-5.9	-1.1	+3.0	+6.5	+8.2	+11.8	+23.5	+24.0		
7.0	720	-20.0			-13.5	-12.1	-9.4	-6.0	-1.6	+2.9	+6.2	+8.9	+13.2	+25.0	+26.0		
8.0	720	-20.0			-13.9	-12.4	-10.5	-7.2	-2.0	+2.3	+6.4	+8.7	+13.9	+24.5	+25.0		
9.0	720	-22.0			-17.1	-14.7	-12.3	-8.3	-2.7	+2.2	+5.8	+8.3	+13.9	+20.0	+21.0		
10.0	720	-26.0			-21.7	-17.7	-14.1	-9.9	-3.7	+1.9	+5.9	+9.2	+13.9	+22.0	+23.0		
11.0	720	-32.0			-23.3	-20.7	-17.5	-12.0	-4.6	+1.9	+6.6	+9.6	+15.2	+24.0	+25.0		
12.0	720	-33.0			-25.9	-23.7	-20.8	-13.8	-5.6	+1.7	+6.3	+10.2	+14.4	+24.0	+25.0		
13.0	720	-31.0			-29.3	-26.9	-23.0	-14.8	-5.9	+1.4	+6.8	+11.1	+12.9	+24.0	+25.0		
14.0	720	-32.0			-26.4	-23.7	-20.2	-13.9	-5.3	+1.8	+7.6	+11.5	+14.8	+28.0	+29.0		
15.0	720	-24.0			-19.1	-17.2	-15.0	-10.5	-4.0	+3.2	+7.6	+11.8	+15.9	+26.0	+27.0		
16.0	720	-16.0			-13.2	-12.3	-10.0	-5.9	-1.5	+3.7	+7.1	+10.0	+10.9	+17.0	+18.0		
17.0	720	-12.0			-9.9	-8.8	-6.8	-3.6	-0.1	+4.7	+7.4	+9.7	+12.2	+15.5	+16.0		
18.0	720	-10.0			-6.5	-5.0	-3.6	-0.9	+1.9	+5.7	+8.4	+10.0	+11.7	+15.0	+16.0		
19.0	720	-6.0			-3.4	-2.4	-1.0	+0.5	+3.9	+7.3	+9.9	+10.8	+11.9	+14.5	+15.0		
20.0	720	-3.0			-1.3	-0.7	-0.0	+2.3	+5.6	+9.1	+11.7	+12.8	+13.8	+21.0	+22.0		
21.0	720	-3.0			-0.1	+0.6	+1.7	+4.1	+6.9	+10.6	+12.9	+14.3	+15.5	+20.0	+21.0		
22.0	720	+0.0			+0.6	+1.6	+3.0	+5.0	+8.1	+11.6	+13.8	+15.5	+17.3	+18.7	+19.0		
23.0	720	+0.0			+0.1	+2.3	+3.4	+5.6	+9.1	+12.5	+14.6	+15.7	+16.8	+19.0	+20.0		
24.0	720	+0.0			+1.0	+2.0	+3.6	+5.9	+9.2	+12.7	+14.8	+16.4	+18.4	+22.0	+23.0		
25.0	720	-7.0			+1.3	+2.4	+4.0	+6.0	+9.6	+13.4	+16.6	+17.9	+18.9	+22.0	+23.0		
26.0	720	+0.0			+1.2	+2.2	+3.5	+5.6	+9.7	+13.8	+17.5	+18.9	+20.4	+22.0	+23.0		
27.0	720	+0.0			-0.1	+1.0	+2.4	+5.5	+9.5	+14.5	+17.9	+19.7	+21.4	+30.0	+31.0		
28.0	104	1.0			1.4	3.4	5.4	10.4	14.4	17.4	18.4	19.4	19.4	19.4	19.7		
29.0	107	0.5			1.1	2.2	3.2	6.2	10.2	14.2	17.2	22.2	23.0	24.0	25.1		
30.0	104	-1.4			-0.4	-0.4	1.2	5.1	9.6	14.6	17.6	20.6	21.6	24.6	25.6		
31.0	104	-6.7			-5.0	-0.5	2.4	5.4	9.4	15.0	18.4	19.4	21.0	26.1	26.3		
32.0	104	-8.2			-5.0	-0.5	0.4	4.4	9.4	15.0	18.4	19.4	21.0	26.1	26.3		
33.0	104	-5.3			-4.0	-3.5	1.4	5.1	9.3	14.5	18.4	19.4	21.0	26.1	26.3		
34.0	104	-7.8			-6.0	-5.4	-2.4	2.4	4.4	14.7	20.1	20.6	21.6	22.1	22.2		
35.0	104	-14.8			-11.0	-7.5	-3.6	1.0	7.5	15.0	17.0	22.2	22.6	23.1	23.2		
36.0	104	-12.6			-7.0	-6.5	-4.2	-0.3	7.0	14.7	19.0	21.6	23.0	25.0	25.1		
37.0	107	-12.1			-0.0	-6.4	-3.5	1.0	4.4	14.5	19.4	23.4	24.0	24.3	24.5		
38.0	106	-9.4			-4.0	-7.4	-4.4	0.0	4.2	15.1	19.4	22.6	23.0	24.4	24.9		
39.0	106	-11.0			-0.4	-9.4	-5.4	1.0	0.0	16.2	19.4	21.6	22.0	23.9	24.1		
40.0	106	-10.4			-7.0	-6.0	-3.7	2.5	7.7	17.4	21.6	24.6	25.0	27.1	27.1		
41.0	102	-4.8			-0.4	-7.4	-3.4	0.7	7.0	17.0	24.3	27.7	29.0	34.0	34.2		
42.0	102	-7.7			-7.7	-7.3	-5.6	0.4	6.4	15.0	26.0	30.7	32.0	34.2	34.4		
43.0	100	-0.3			-9.0	-6.0	-5.0	0.2	4.3	20.3	29.6	31.7	34.0	37.6	37.6		
44.0	94	-7.6			-6.0	-5.0	-0.0	0.0	4.4	10.4	20.1	32.7	35.7	36.3	36.4		
45.0	94	-8.2			-7.4	-5.4	-1.0	7.3	10.5	24.6	32.0	40.1	41.2	41.4			
46.0	94	-17.2			-8.0	-5.4	1.2	7.0	15.5	23.3	26.0	34.4	35.4	35.5			
47.0	86	-15.3			-0.5	-5.4	-0.2	4.4	17.7	23.0	27.0	29.1	29.5	29.5			
48.0	86	-8.0			-7.7	-5.0	-2.2	7.4	14.8	24.4	26.1	29.2	29.0	30.0			
49.0	83	-10.4			-0.1	-7.4	-1.0	7.2	10.0	22.0	24.1	29.2	30.2	30.3			
50.0	81	-10.9			-10.2	-8.0	-3.4	6.2	15.5	24.5	24.0	32.2	32.0	33.0			
51.0	76	-17.4			-13.3	-11.2	-3.6	5.0	17.5	25.2	31.4	34.2	34.4	34.9			
52.0	66	-25.1			-0.5	-6.4	-2.4	4.5	21.5	24.4	24.0	32.4	33.2	33.3			
53.0	61	-26.2			-13.6	-8.0	-2.0	3.6	20.2	27.0	30.4	31.5	32.2	32.3			
54.0	54	-22.7			-19.7	-13.1	-7.4	3.0	19.2	25.1	24.7	29.5	30.2	30.2			
55.0	54	-23.3			-17.0	-17.1	-10.3	0.5	15.3	20.6	22.7	31.4	31.4	31.9			
56.0	46	-22.2			-17.0	-15.4	-7.0	1.0	12.4	19.7	24.0	25.4	25.0	26.0			
57.0	37	-27.0			-19.1	-19.1	-11.1	0.4	12.1	23.4	24.2	24.4	24.4	24.4			
58.0	31	-35.3			-29.4	-29.4	-15.1	-0.5	12.1	23.4	24.2	24.4	24.4	24.4			
59.0	20	-24.3			-24.0	-24.0	-12.4	-1.5	9.4	19.0	24.0	24.4	24.7	24.4			
60.0	12	-34.1			-27.1	-27.1	-17.1	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
61.0	4	-47.9			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
62.0	4	-72.6			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
63.0	4	-97.6			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
64.0	2	-45.2			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
65.0	1	-45.1			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
66.0	1	-54.3			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
67.0	1	-40.6			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
68.0	1	-29.8			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
69.0	1	-17.3			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			
70.0	1	-1.9			-27.7	-27.7	-17.7	-7.0	10.1	14.4	15.4	15.3	15.4	15.5			

Positive is wind from the right (120°).
Negative is wind from the left (300°).

DATA SOURCE											OCTOBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
5FC	744	-9.0	-8.9	-7.3	-6.2	-4.7	-2.7	-0.4	+2.3	+4.1	+5.3	+6.2	+7.9	+11.0		
100	744	-19.0	-16.9	-12.1	-9.7	-7.1	-4.6	-0.0	+4.6	+7.6	+9.4	+11.7	+13.9	+16.0		
200	744	-18.0	-21.9	-14.7	-11.7	-9.7	-5.9	-0.8	+3.0	+6.2	+8.3	+10.8	+12.9	+14.0		
300	744	-22.0	-21.9	-17.2	-13.8	-11.6	-7.5	-1.9	+1.8	+4.9	+6.9	+9.5	+12.9	+16.0		
400	744	-25.0	-24.9	-19.5	-15.6	-13.0	-8.9	-3.4	+0.8	+4.3	+5.8	+8.6	+10.4	+11.0		
500	744	-28.0	-29.9	-21.5	-18.8	-15.4	-10.5	-4.9	+0.0	+3.1	+4.5	+5.8	+7.9	+9.0		
600	744	-32.0	-35.9	-24.7	-21.8	-18.1	-12.4	-6.0	+0.5	+2.1	+3.6	+4.9	+6.9	+9.0		
700	744	-39.0	-42.0	-28.8	-26.4	-22.2	-14.7	-7.8	-0.7	+1.7	+3.3	+4.8	+6.9	+11.0		
800	744	-42.0	-44.9	-32.5	-29.6	-26.1	-18.3	-9.8	-1.4	+1.4	+2.9	+4.8	+7.4	+8.0		
900	744	-52.0	-54.9	-40.7	-33.3	-30.1	-21.8	-11.7	-2.0	+1.6	+2.9	+4.6	+7.9	+9.0		
1000	744	-51.0	-54.9	-40.7	-33.3	-30.1	-21.8	-11.7	-2.0	+1.6	+2.9	+4.6	+7.9	+9.0		
1100	744	-58.0	-58.9	-47.8	-43.5	-36.9	-28.7	-15.4	-2.7	+2.9	+5.6	+7.5	+15.9	+20.0		
1200	744	-65.0	-68.9	-54.2	-49.0	-43.0	-30.6	-17.4	-4.2	+1.7	+5.2	+7.5	+18.9	+21.0		
1300	744	-60.0	-68.9	-49.5	-44.5	-38.5	-29.9	-17.8	-5.8	+0.6	+3.8	+6.5	+13.4	+14.0		
1400	744	-61.0	-68.9	-49.5	-44.5	-38.5	-29.9	-17.8	-5.8	+0.6	+3.8	+6.5	+13.4	+14.0		
1500	744	-56.0	-68.9	-43.6	-37.6	-32.6	-29.2	-13.5	-5.0	-0.4	+1.5	+4.5	+6.9	+9.0		
1600	744	-39.0	-36.9	-29.5	-25.0	-22.4	-17.0	-9.7	-2.9	-0.0	+1.8	+4.5	+6.9	+9.0		
1700	744	-30.0	-27.9	-21.6	-19.4	-16.5	-11.7	-5.6	-0.6	+1.7	+4.0	+5.3	+6.9	+8.0		
1800	744	-24.0	-21.9	-16.8	-13.8	-11.4	-6.9	-2.3	+0.7	+3.2	+4.2	+5.5	+6.9	+11.0		
1900	744	-21.0	-18.9	-13.9	-10.6	-7.3	-5.1	-2.3	+0.6	+4.0	+6.2	+7.0	+8.3	+9.9		
2000	744	-15.0	-9.9	-7.5	-6.2	-4.3	-1.5	+1.3	+4.8	+6.7	+7.8	+8.6	+10.9	+12.0		
2100	744	-13.0	-10.9	-7.1	-5.6	-3.8	-0.9	+1.6	+5.4	+7.8	+9.2	+9.9	+11.8	+12.0		
2200	744	-12.0	-10.9	-7.3	-5.8	-3.9	-1.1	+2.3	+5.8	+8.3	+9.5	+10.7	+11.8	+12.0		
2300	744	-13.0	-10.9	-7.1	-5.8	-3.9	-1.1	+2.3	+5.8	+8.3	+9.5	+10.7	+11.8	+12.0		
2400	744	-11.0	-10.9	-6.1	-6.5	-4.2	-1.3	+2.3	+6.2	+8.7	+10.3	+11.8	+14.4	+15.0		
2500	744	-14.0	-11.9	-9.3	-7.8	-5.7	-1.5	+1.8	+6.1	+8.7	+9.8	+10.8	+13.4	+14.0		
2600	744	-17.0	-15.9	-11.1	-9.4	-6.7	-2.8	+1.0	+5.8	+8.6	+10.4	+11.9	+13.6	+14.0		
2700	744	-16.0	-15.9	-12.8	-10.5	-8.5	-4.4	+0.1	+5.0	+8.6	+10.2	+11.8	+14.9	+17.0		
2800	74	-9.8	-8.8	-6.2	-4.2	-2.4	-0.5	+0.5	+6.2	+10.1	+13.2	+16.2	+17.0	+17.1		
2900	82	-11.4	-10.4	-8.4	-6.4	-4.4	-1.1	+1.1	+5.3	+9.0	+11.1	+13.1	+14.3	+14.4		
3000	84	-12.6	-11.6	-9.6	-7.6	-5.6	-1.6	+1.6	+6.4	+10.4	+13.4	+16.4	+17.4	+17.5		
3100	85	-18.8	-17.8	-15.8	-13.8	-11.8	-7.8	-3.8	+0.2	+3.2	+4.2	+5.5	+6.9	+11.0		
3200	90	-20.5	-19.5	-17.5	-15.5	-13.5	-9.5	-5.5	-0.2	+2.8	+3.8	+5.1	+6.5	+10.0		
3300	90	-25.0	-24.0	-22.0	-20.0	-18.0	-14.0	-10.0	-0.2	+3.8	+4.8	+6.1	+7.5	+11.0		
3400	90	-28.4	-27.4	-25.4	-23.4	-21.4	-17.4	-13.4	-0.7	+4.7	+5.7	+7.0	+8.4	+11.0		
3500	90	-33.0	-32.0	-30.0	-28.0	-26.0	-22.0	-18.0	-1.7	+5.7	+6.7	+8.0	+9.4	+12.0		
3600	91	-35.7	-34.7	-32.7	-30.7	-28.7	-24.7	-20.7	-1.4	+6.3	+7.3	+8.6	+10.0	+12.0		
3700	90	-36.7	-35.7	-33.7	-31.7	-29.7	-25.7	-21.7	-1.7	+6.3	+7.3	+8.6	+10.0	+12.0		
3800	89	-37.8	-36.8	-34.8	-32.8	-30.8	-26.8	-22.8	-1.9	+6.3	+7.3	+8.6	+10.0	+12.0		
3900	94	-39.0	-38.0	-36.0	-34.0	-32.0	-28.0	-24.0	-0.6	+7.0	+8.0	+9.3	+10.7	+12.0		
4000	95	-42.8	-41.8	-39.8	-37.8	-35.8	-31.8	-27.8	-0.5	+7.4	+8.4	+9.7	+11.1	+12.0		
4100	94	-46.1	-45.1	-43.1	-41.1	-39.1	-35.1	-31.1	-1.7	+7.6	+8.6	+9.9	+11.3	+12.0		
4200	97	-51.7	-50.7	-48.7	-46.7	-44.7	-40.7	-36.7	-0.8	+7.4	+8.4	+9.7	+11.1	+12.0		
4300	97	-51.8	-50.8	-48.8	-46.8	-44.8	-40.8	-36.8	-0.8	+7.4	+8.4	+9.7	+11.1	+12.0		
4400	94	-49.3	-48.3	-46.3	-44.3	-42.3	-38.3	-34.3	-0.7	+7.7	+8.7	+10.0	+11.4	+12.0		
4500	92	-50.1	-49.1	-47.1	-45.1	-43.1	-39.1	-35.1	-0.4	+8.0	+9.0	+10.3	+11.7	+12.0		
4600	93	-52.0	-51.0	-49.0	-47.0	-45.0	-41.0	-37.0	-0.7	+8.1	+9.1	+10.4	+11.8	+12.0		
4700	91	-51.8	-50.8	-48.8	-46.8	-44.8	-40.8	-36.8	-0.6	+8.5	+9.5	+10.8	+12.2	+12.0		
4800	89	-52.4	-51.4	-49.4	-47.4	-45.4	-41.4	-37.4	-0.1	+8.6	+9.6	+10.9	+12.3	+12.0		
4900	86	-59.1	-58.1	-56.1	-54.1	-52.1	-48.1	-44.1	-0.2	+11.3	+12.3	+13.6	+15.0	+15.0		
5000	84	-64.2	-63.2	-61.2	-59.2	-57.2	-53.2	-49.2	-1.1	+11.1	+12.1	+13.4	+14.8	+14.0		
5100	79	-65.0	-64.0	-62.0	-60.0	-58.0	-54.0	-50.0	-0.5	+11.9	+12.9	+14.2	+15.6	+14.0		
5200	75	-66.3	-65.3	-63.3	-61.3	-59.3	-55.3	-51.3	-0.6	+11.9	+12.9	+14.2	+15.6	+14.0		
5300	70	-71.0	-70.0	-68.0	-66.0	-64.0	-60.0	-56.0	-0.7	+12.7	+13.7	+15.0	+16.4	+14.0		
5400	51	-62.6	-61.6	-59.6	-57.6	-55.6	-51.6	-47.6	-0.5	+12.0	+13.0	+14.3	+15.7	+14.0		
5500	57	-61.2	-60.2	-58.2	-56.2	-54.2	-50.2	-46.2	-0.5	+12.0	+13.0	+14.3	+15.7	+14.0		
5600	48	-60.5	-59.5	-57.5	-55.5	-53.5	-49.5	-45.5	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
5700	40	-66.1	-65.1	-63.1	-61.1	-59.1	-55.1	-51.1	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
5800	34	-63.9	-62.9	-60.9	-58.9	-56.9	-52.9	-48.9	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
5900	27	-65.2	-64.2	-62.2	-60.2	-58.2	-54.2	-50.2	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6000	22	-61.6	-60.6	-58.6	-56.6	-54.6	-50.6	-46.6	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6100	14	-70.0	-69.0	-67.0	-65.0	-63.0	-59.0	-55.0	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6200	4	-68.1	-67.1	-65.1	-63.1	-61.1	-57.1	-53.1	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6300	2	-78.2	-77.2	-75.2	-73.2	-71.2	-67.2	-63.2	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6400	1	-35.3	-34.3	-32.3	-30.3	-28.3	-24.3	-20.3	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6500	1	-34.7	-33.7	-31.7	-29.7	-27.7	-23.7	-19.7	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6600	1	-22.5	-21.5	-19.5	-17.5	-15.5	-11.5	-7.5	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6700	1	-13.2	-12.2	-10.2	-8.2	-6.2	-2.2	+1.8	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6800	1	-4.0	-3.0	-1.0	+1.0	+3.0	+7.0	+11.0	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
6900	1	-5.5	-4.5	-2.5	-0.5	+1.5	+5.5	+9.5	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		
7000	1	-15.3	-14.3	-12.3	-10.3	-8.3	-4.3	+0.3	-0.4	+12.0	+13.0	+14.3	+15.7	+14.0		

Positive is wind from the right (120°).
Negative is wind from the left (300°).

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	CUMULATIVE 2.280	5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-11.0			-9.1	-6.9	-5.8	-3.6	-0.6	+1.6	+3.4	+4.7	+5.6	+7.0	+8.0	
1.0	720	-21.0			-16.7	-13.3	-10.5	-5.8	-0.3	+4.7	+7.8	+9.1	+9.8	+12.0	+13.0	
2.0	720	-29.0			-19.8	-16.5	-13.2	-7.4	-1.8	+2.9	+6.2	+7.3	+8.7	+11.0	+12.0	
3.0	720	-32.0			-23.2	-19.6	-16.2	-10.3	-4.1	+1.0	+4.2	+5.4	+6.5	+8.0	+9.0	
4.0	720	-35.0			-25.5	-22.6	-17.8	-13.0	-5.9	-0.4	+1.8	+4.5	+6.2	+8.6	+9.0	
5.0	720	-38.0			-27.7	-25.1	-21.0	-16.2	-8.0	-1.5	+1.5	+3.9	+5.4	+8.5	+9.0	
6.0	720	-45.0			-31.3	-28.8	-25.2	-19.5	-10.2	-3.6	+0.3	+2.7	+4.6	+9.0	+10.0	
7.0	720	-48.0			-35.7	-30.5	-27.7	-22.1	-13.3	-5.5	-0.4	+1.8	+4.9	+9.5	+10.0	
8.0	720	-49.0			-41.7	-36.5	-31.7	-25.2	-16.0	-7.3	-1.3	+1.2	+3.8	+11.5	+12.0	
9.0	720	-54.0			-44.1	-40.1	-34.7	-27.9	-18.7	-9.4	-2.2	+1.2	+2.9	+11.0	+12.0	
10.0	720	-56.0			-48.3	-43.8	-38.6	-31.6	-21.1	-10.7	-2.9	-0.0	+5.2	+10.5	+11.0	
11.0	720	-59.0			-52.2	-46.6	-42.7	-34.7	-24.2	-12.4	-5.1	-1.7	+4.8	+8.6	+9.0	
12.0	720	-62.0			-51.7	-48.6	-45.0	-36.9	-26.1	-14.3	-6.5	-2.3	-0.0	+11.5	+12.0	
13.0	720	-60.0			-50.7	-47.6	-44.5	-36.3	-26.2	-15.4	-7.9	-3.4	-0.5	+16.0	+17.0	
14.0	720	-55.0			-47.2	-44.5	-39.8	-33.9	-24.7	-14.2	-8.2	-4.6	-0.1	+15.0	+16.0	
15.0	720	-46.0			-39.2	-37.9	-34.2	-28.7	-21.1	-13.0	-6.3	-3.4	-1.0	+10.0	+11.0	
16.0	720	-36.0			-32.3	-30.5	-28.7	-23.6	-17.5	-9.7	-4.3	-1.3	-0.0	+10.0	+11.0	
17.0	720	-30.0			-28.1	-26.1	-24.2	-19.4	-12.8	-6.1	-1.4	+0.3	+2.2	+14.0	+15.0	
18.0	720	-25.0			-22.3	-20.6	-18.4	-14.2	-8.7	-2.6	+0.6	+2.5	+4.2	+8.0	+9.0	
19.0	720	-24.0			-17.1	-16.2	-14.2	-10.3	-5.4	-0.7	+1.8	+3.5	+5.2	+7.5	+8.0	
20.0	720	-22.0			-15.2	-13.8	-11.7	-7.8	-3.5	+0.0	+3.0	+4.6	+5.8	+8.5	+9.0	
21.0	720	-19.0			-15.8	-13.1	-10.8	-7.0	-2.6	+0.8	+3.6	+5.0	+5.8	+8.5	+9.0	
22.0	720	-20.0			-16.7	-13.9	-11.2	-7.3	-2.4	+1.4	+3.8	+4.7	+5.6	+8.0	+9.0	
23.0	720	-23.0			-17.3	-15.1	-11.6	-7.6	-3.0	+0.9	+4.7	+5.8	+6.9	+11.0	+12.0	
24.0	720	-21.0			-18.4	-15.5	-13.1	-8.9	-4.1	+0.8	+4.9	+6.8	+8.2	+16.0	+17.0	
25.0	720	-33.0			-18.9	-17.3	-14.7	-11.5	-5.5	+0.1	+4.6	+6.5	+8.4	+12.5	+13.0	
26.0	720	-31.0			-20.9	-18.6	-16.6	-13.2	-7.1	+0.2	+4.3	+7.5	+10.4	+16.0	+17.0	
27.0	720	-30.0			-21.9	-20.4	-19.1	-15.2	-8.8	-0.6	+5.5	+8.9	+12.9	+20.0	+21.0	
28.0	89	-27.0			-25.6	-20.6	-18.0	-14.0	-9.0	-0.4	3.0	11.5	20.1	20.0	21.1	
29.0	90	-27.2			-25.6	-23.8	-19.6	-11.4	-1.6	4.5	11.0	17.1	19.2	19.5	19.5	
30.0	90	-31.1			-30.0	-26.8	-21.4	-11.2	-2.6	5.5	9.0	15.1	15.0	15.0	15.0	
31.0	91	-37.0			-29.5	-24.5	-23.6	-14.0	-5.4	5.5	7.0	9.0	10.4	10.5	10.5	
32.0	91	-39.9			-33.0	-31.7	-26.2	-19.1	-8.1	1.5	8.5	7.1	7.5	7.5	7.7	
33.0	92	-40.8			-37.0	-35.4	-30.2	-20.2	-10.3	-0.6	4.0	14.1	14.6	14.7	14.6	
34.0	92	-39.8			-35.4	-36.7	-32.7	-23.0	-11.6	-3.2	1.0	19.0	19.5	19.6	19.6	
35.0	92	-41.2			-40.0	-40.9	-38.4	-26.2	-15.0	-0.8	0.0	20.1	21.2	21.4	21.4	
36.0	90	-44.9			-43.0	-40.8	-36.0	-27.6	-16.1	-2.5	1.5	22.1	23.0	23.2	23.2	
37.0	91	-47.3			-44.5	-42.7	-37.4	-29.2	-19.4	-8.5	-0.5	25.1	25.7	25.7	25.7	
38.0	95	-40.0			-44.0	-43.6	-38.4	-31.3	-19.0	-3.7	1.0	15.1	17.0	17.2	17.2	
39.0	94	-46.1			-44.0	-42.6	-40.4	-34.0	-21.2	-4.7	-1.1	3.4	3.7	3.7	3.7	
40.0	93	-49.5			-48.4	-44.9	-41.5	-36.2	-21.8	-6.6	-4.1	1.1	1.0	2.0	2.0	
41.0	93	-54.9			-52.0	-46.3	-42.1	-35.7	-22.4	-12.6	-9.1	-4.0	-3.4	-3.4	-3.4	
42.0	93	-57.7			-53.0	-49.7	-44.2	-36.7	-25.8	-14.6	-13.1	-4.0	-4.1	-4.1	-4.1	
43.0	92	-59.5			-54.6	-53.4	-46.2	-39.0	-24.0	-17.6	-12.5	-5.0	-5.0	-5.0	-5.0	
44.0	88	-60.8			-57.0	-55.5	-47.0	-40.4	-29.0	-17.9	-17.3	-4.0	-7.0	-7.8	-7.8	
45.0	87	-79.4			-69.0	-58.3	-52.2	-40.0	-29.2	-21.3	-12.0	-5.8	-5.0	-6.9	-6.9	
46.0	86	-65.3			-63.0	-57.9	-54.7	-48.0	-35.0	-25.1	-15.0	-8.0	-5.8	-5.8	-5.8	
47.0	83	-77.5			-69.1	-63.0	-56.4	-47.2	-30.7	-25.1	-14.0	-8.0	-5.8	-5.8	-5.8	
48.0	82	-82.1			-75.1	-70.4	-61.7	-49.5	-31.0	-26.0	-10.0	-0.0	-0.0	-0.0	-0.0	
49.0	85	-80.6			-70.1	-74.7	-63.2	-50.7	-35.3	-20.6	-14.0	0.0	1.1	1.2	1.2	
50.0	84	-86.4			-82.1	-70.4	-67.7	-55.0	-41.2	-19.2	-13.0	-5.8	-4.8	-4.8	-4.8	
51.0	77	-93.9			-87.2	-80.6	-68.4	-55.0	-42.1	-15.9	-10.8	-7.8	-7.8	-7.8	-7.8	
52.0	74	-95.5			-82.3	-77.3	-69.1	-56.2	-40.7	-19.7	-11.7	-7.8	-7.8	-7.8	-7.8	
53.0	70	-96.6			-81.4	-78.5	-73.9	-54.4	-41.1	-15.5	-10.6	-7.8	-7.8	-7.8	-7.8	
54.0	61	-97.8			-79.4	-78.0	-71.0	-54.3	-41.8	-31.5	-15.8	-7.7	-7.8	-7.8	-7.8	
55.0	52	-83.7			-79.4	-78.4	-71.0	-54.3	-41.8	-31.5	-15.8	-7.7	-7.8	-7.8	-7.8	
56.0	47	-89.9			-83.7	-74.5	-59.5	-41.5	-28.3	-21.1	-14.1	-9.1	-7.8	-7.8	-7.8	
57.0	45	-97.0			-97.0	-88.7	-75.0	-63.2	-45.1	-21.2	-11.0	-6.2	-5.7	-5.7	-5.7	
58.0	38	-103.4			-91.1	-70.5	-59.5	-41.0	-14.0	-4.0	-4.0	-4.5	-4.3	-4.3	-4.3	
59.0	29	-83.9			-81.5	-70.8	-59.7	-41.5	-31.4	-17.7	-17.3	-17.1	-17.0	-17.0	-17.0	
60.0	21	-97.4			-83.9	-70.7	-59.5	-41.5	-31.4	-17.7	-17.3	-17.1	-17.0	-17.0	-17.0	
61.0	16	-84.3					-77.5	-61.0	-36.5	-29.7	-24.2	-23.0	-23.8	-23.7	-23.7	
62.0	15	-94.0					-79.6	-59.5	-43.4	-32.7	-32.3	-32.1	-32.0	-32.0	-32.0	
63.0	11	-90.5					-86.3	-62.2	-41.7	-32.6	-32.4	-32.2	-32.2	-32.2	-32.2	
64.0	7	-130.2					-74.0	-57.5	-45.1	-35.2	-34.0	-32.8	-32.8	-32.8	-32.8	
65.0	6	-66.3						-51.0	-33.0	-33.2	-33.0	-32.0	-32.8	-32.8	-32.8	
66.0	4	-53.6						-48.0	-33.0	-33.2	-33.0	-32.0	-32.8	-32.8	-32.8	
67.0	4	-61.0						-53.0	-26.7	-26.3	-26.2	-26.1	-26.1	-26.1	-26.1	
68.0	4	-69.7						-58.0	-18.7	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	
69.0	3	-37.6						-34.5	-5.5	-5.4	-5.3	-5.3	-5.3	-5.3	-5.3	
70.0	2	-43.9						-44.0	9.0	9.2	9.2	9.3	9.3	9.3	9.3	

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.12

DATA SOURCE										DECEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM BBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-11.0	-9.9	-8.7	-7.6	-6.5		-5.4	-4.3	-3.2	-2.1	-1.0	0.1	1.2	2.3	3.4	4.5
1.0	744	-22.0	-21.9	-18.3	-15.6	-11.9		-7.1	-0.5	+4.5	+7.1	+8.4	+10.7	+14.9	+19.0	+23.0	+27.0
2.0	744	-27.0	-24.9	-22.1	-18.7	-15.0		-10.1	-3.1	+2.0	+4.5	+6.0	+8.4	+14.9	+19.0	+23.0	+27.0
3.0	744	-31.0	-30.9	-26.7	-22.0	-17.9	-12.9	-6.1	+0.2	+2.2	+3.6	+5.2	+8.4	+14.9	+19.0	+27.0	
4.0	744	-36.0	-32.9	-29.5	-25.3	-21.7	-15.7	-8.7	-2.0	+0.4	+2.3	+3.5	+6.9	+14.9	+19.0	+27.0	
5.0	744	-40.0	-39.9	-34.2	-29.5	-25.5	-18.7	-10.9	-3.5	-0.3	+1.6	+5.1	+6.9	+14.9	+19.0	+27.0	
6.0	744	-48.0	-43.9	-37.5	-33.2	-29.2	-21.8	-13.4	-5.3	-1.1	+0.0	+3.1	+6.9	+14.9	+19.0	+27.0	
7.0	744	-48.0	-41.5	-36.3	-32.3	-25.1	-16.3	-7.0	-1.8	-0.2	+2.3	+9.9	+20.0	+27.0	+27.0	+27.0	
8.0	744	-52.0	-47.9	-43.7	-39.7	-36.1	-29.1	-18.7	-8.8	-2.7	-0.4	+3.1	+7.9	+11.0	+11.0	+11.0	
9.0	744	-56.0	-52.9	-48.6	-45.0	-40.8	-34.0	-21.1	-10.0	-4.0	-0.7	-0.0	+7.9	+10.0	+10.0	+10.0	
10.0	744	-64.0	-60.9	-56.8	-52.5	-46.9	-37.2	-23.5	-11.1	-4.7	-2.1	-0.1	+9.9	+12.0	+12.0	+12.0	
11.0	744	-64.0	-58.5	-53.6	-49.3	-43.9	-36.9	-25.9	-12.5	-6.0	-2.9	-0.2	+5.9	+7.0	+7.0	+7.0	
12.0	744	-74.0	-70.9	-61.5	-56.4	-52.2	-41.7	-27.8	-14.5	-7.2	-4.5	-1.4	+5.9	+10.0	+10.0	+10.0	
13.0	744	-72.0	-57.5	-54.8	-50.5	-45.5	-40.8	-28.2	-16.5	-10.2	-6.9	-4.0	+1.4	+2.0	+2.0	+2.0	
14.0	744	-65.0	-64.9	-55.5	-49.5	-45.5	-38.7	-27.6	-16.4	-11.0	-7.3	-4.1	+0.3	+0.3	+0.3	+0.3	
15.0	744	-58.0	-51.9	-47.8	-44.0	-41.8	-34.4	-24.8	-15.3	-9.9	-7.2	-3.4	+0.0	+0.0	+0.0	+0.0	
16.0	744	-54.0	-47.9	-43.2	-39.3	-34.8	-29.5	-20.9	-13.2	-8.2	-5.1	-0.8	+0.9	+2.0	+2.0	+2.0	
17.0	744	-46.0	-43.9	-35.3	-32.5	-28.7	-24.5	-17.2	-10.7	-5.7	-3.2	-0.4	+5.4	+6.0	+6.0	+6.0	
18.0	744	-33.0	-32.9	-27.5	-26.1	-22.8	-19.3	-13.3	-7.1	-2.7	-0.2	+0.9	+6.9	+18.0	+18.0	+18.0	
19.0	744	-32.0	-27.9	-23.7	-21.7	-19.4	-14.8	-8.7	-3.9	-0.4	+1.2	+2.9	+5.9	+8.0	+8.0	+8.0	
20.0	744	-29.0	-23.7	-21.0	-17.1	-12.0	-6.2	-1.6	+0.0	+2.2	+3.7	+6.6	+7.0	+7.0	+7.0	+7.0	
21.0	744	-27.0	-21.8	-17.7	-14.9	-10.6	-5.4	-0.8	+0.9	+2.7	+4.5	+5.9	+7.0	+7.0	+7.0	+7.0	
22.0	744	-27.0	-19.3	-17.1	-14.3	-10.9	-5.7	-1.0	+2.0	+4.2	+4.2	+7.9	+11.0	+11.0	+11.0	+11.0	
23.0	744	-33.0	-24.9	-21.2	-19.0	-16.4	-11.8	-6.5	-1.0	+2.4	+4.5	+5.9	+9.9	+12.0	+12.0	+12.0	
24.0	744	-39.0	-24.7	-21.6	-19.2	-14.1	-7.8	-1.9	+3.1	+5.1	+6.7	+10.4	+11.0	+11.0	+11.0	+11.0	
25.0	744	-35.0	-34.9	-28.2	-24.5	-21.6	-16.6	-9.9	-2.4	+3.0	+6.0	+7.5	+10.9	+12.0	+12.0	+12.0	
26.0	744	-34.0	-32.9	-30.2	-27.5	-24.3	-18.5	-11.3	-2.8	+4.3	+7.8	+10.7	+15.4	+16.0	+16.0	+16.0	
27.0	744	-40.0	-39.9	-29.8	-28.0	-24.9	-19.7	-12.8	-2.8	+5.8	+10.4	+14.9	+19.9	+22.0	+22.0	+22.0	
28.0	132	-24.0	-24.0	-25.0	-24.0	-24.0	-20.0	-13.4	5.0	12.0	14.0	15.0	19.0	20.2	20.2	20.2	
29.0	134	-34.6	-34.7	-24.0	-26.3	-23.4	-14.7	9.4	13.4	16.5	18.7	23.0	23.2	23.2	23.2	23.2	
30.0	139	-40.7	-34.6	-34.0	-31.1	-23.0	-16.1	0.2	17.0	18.0	18.0	18.0	22.0	22.7	22.7	22.7	
31.0	140	-40.4	-34.6	-37.0	-35.0	-25.0	-17.5	0.0	21.0	24.0	26.0	26.0	26.0	26.0	26.0	26.0	
32.0	141	-42.4	-45.6	-40.4	-35.6	-24.0	-14.5	0.4	26.0	27.0	31.0	31.0	31.0	31.0	31.0	31.0	
33.0	141	-51.1	-50.6	-44.0	-38.0	-32.1	-19.5	0.0	29.0	30.0	34.0	34.0	34.0	34.0	34.0	34.0	
34.0	141	-51.4	-52.6	-49.0	-44.7	-38.1	-19.4	10.4	24.0	27.0	26.0	40.0	40.0	40.0	40.0	40.0	
35.0	141	-54.4	-53.6	-51.0	-49.5	-40.5	-30.2	10.5	14.6	23.0	29.0	32.0	47.0	47.0	47.0	47.0	
36.0	141	-60.8	-60.6	-57.0	-53.3	-43.2	-22.2	10.5	26.0	29.0	29.0	49.0	49.0	49.0	49.0	49.0	
37.0	141	-64.8	-65.0	-65.0	-65.0	-57.0	-43.3	-22.5	15.0	24.0	32.0	39.0	47.1	47.1	47.1	47.1	
38.0	142	-74.8	-72.6	-69.0	-65.0	-59.0	-44.0	-26.0	14.5	33.0	37.0	38.0	39.0	40.1	40.1	40.1	
39.0	142	-74.3	-74.8	-71.0	-60.6	-47.7	-27.5	14.5	34.0	37.0	41.0	41.0	49.1	49.3	49.3	49.3	
40.0	142	-79.3	-74.6	-69.4	-61.0	-50.2	-29.4	14.7	29.0	35.0	39.0	39.0	55.0	55.0	55.0	55.0	
41.0	140	-70.2	-64.6	-62.0	-60.0	-52.0	-27.0	18.0	34.0	35.0	40.0	41.0	41.0	41.0	41.0	41.0	
42.0	140	-70.2	-64.6	-62.0	-60.0	-52.0	-27.0	18.0	34.0	35.0	40.0	41.0	41.0	41.0	41.0	41.0	
43.0	139	-81.8	-64.6	-62.0	-60.0	-52.0	-26.1	14.0	32.0	34.0	41.0	41.0	51.0	52.1	52.1	52.1	
44.0	140	-80.8	-64.6	-62.0	-60.0	-52.0	-25.3	14.0	30.0	31.0	41.0	41.0	43.1	43.1	43.1	43.1	
45.0	138	-85.1	-72.6	-64.0	-62.7	-57.0	-22.7	11.7	24.0	31.0	42.0	42.0	50.1	50.4	50.4	50.4	
46.0	137	-86.0	-75.6	-67.0	-65.0	-60.6	-24.5	0.0	26.0	31.0	45.0	45.0	47.7	47.7	47.7	47.7	
47.0	138	-80.4	-76.6	-73.0	-69.4	-62.0	-21.0	0.6	21.0	32.0	43.0	43.0	49.7	49.9	49.9	49.9	
48.0	136	-75.2	-76.0	-73.0	-71.0	-61.0	-18.7	0.0	19.1	30.0	41.0	41.0	51.2	51.5	51.5	51.5	
49.0	130	-82.8	-77.7	-76.0	-72.5	-62.5	-15.0	7.2	17.0	31.0	44.0	44.0	48.0	48.5	48.5	48.5	
50.0	127	-92.8	-81.7	-76.6	-73.7	-62.0	-14.2	0.0	16.7	29.0	41.0	41.0	49.0	49.0	49.0	49.0	
51.0	122	-99.6	-84.8	-74.2	-74.4	-61.9	-15.5	0.5	22.0	30.0	31.0	38.0	38.0	38.0	38.0	38.0	
52.0	115	-101.7	-82.0	-81.7	-78.2	-60.0	-13.5	0.0	21.6	31.0	32.0	32.0	32.0	32.0	32.0	32.0	
53.0	110	-101.4	-92.0	-81.5	-76.7	-60.5	-15.0	0.0	22.5	31.0	33.0	33.0	34.0	34.0	34.0	34.0	
54.0	102	-102.3	-97.0	-84.7	-76.0	-62.0	-15.0	0.0	22.0	24.7	35.0	35.0	37.5	37.5	37.5	37.5	
55.0	92	-94.1	-86.0	-82.0	-75.0	-66.0	-17.5	0.0	23.0	31.0	40.0	40.0	40.0	40.0	40.0	40.0	
56.0	81	-97.8	-90.2	-84.7	-76.4	-67.4	-20.7	0.1	17.0	33.0	43.0	43.0	43.7	43.8	43.8	43.8	
57.0	67	-92.2	-85.7	-76.4	-68.4	-58.7	-25.7	0.7	13.0	37.0	38.0	38.0	38.0	38.0	38.0	38.0	
58.0	51	-81.5	-80.0	-76.4	-68.4	-54.0	-19.5	0.0	19.0	36.0	38.0	38.0	38.0	38.0	38.0	38.0	
59.0	39	-90.3	-79.0	-70.0	-63.0	-51.5	-31.5	0.0	26.0	26.0	26.0	26.0	27.1	27.1	27.1	27.1	
60.0	25	-100.9	-79.0	-70.0	-63.0	-55.5	-33.0	1.5	6.0	12.0	12.0	12.0	12.7	12.7	12.7	12.7	
61.0	15	-93.1	-67.4	-54.5	-45.4	-34.5	-27.7	0.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
62.0	8	-78.6	-67.4	-54.5	-45.4	-34.5	-27.7	0.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
63.0	2	-80.4	-67.4	-54.5	-45.4	-34.5	-27.7	0.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
64.0	1	-76.7	-67.4	-54.5	-45.4	-34.5	-27.7	0.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	

Positive is wind from the right (120°).
Negative is wind from the left (300°).

Positive is wind from the right (120°).
Negative is wind from the left (300°).

RIGHT AND LEFT CROSS WIND COMPONENTS 30 DEGREE FLIGHT AZIMUTH TABLE 3.13

DATA SOURCE											ANNUAL				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED.	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885
SFC	8766	-11.0		-10.1	-7.9	-6.6	-5.2	-2.8	-0.2	+2.6	+4.4	+5.4	+6.1	+7.8	+12.0
1.0	8766	-31.0		-22.0	-16.4	-13.4	-10.4	-5.8	-0.2	+1.3	+7.1	+8.7	+10.2	+15.7	+32.0
2.0	8766	-32.0		-27.2	-20.7	-16.9	-13.4	-7.8	+1.6	+2.4	+5.4	+7.1	+8.9	+14.5	+34.0
3.0	8766	-41.0		-33.0	-24.4	-20.7	-16.9	-10.7	-2.9	+1.3	+4.4	+6.2	+7.8	+13.0	+33.0
4.0	8766	-51.0		-38.6	-28.3	-24.5	-20.3	-13.3	-4.1	+0.6	+3.9	+5.7	+7.4	+12.0	+28.0
5.0	8766	-64.0		-43.7	-32.7	-27.9	-23.9	-16.2	-5.6	+0.2	+3.7	+5.5	+6.9	+11.5	+23.0
6.0	8766	-63.0		-47.4	-36.0	-31.9	-27.5	-19.4	-7.0	-0.1	+3.7	+5.5	+7.2	+12.5	+24.0
7.0	8766	-71.0		-53.7	-41.2	-35.9	-30.7	-22.5	-8.5	-0.1	+3.6	+5.6	+8.0	+13.3	+26.0
8.0	8766	-78.0		-58.2	-46.1	-40.2	-35.0	-25.5	-10.3	-0.2	+3.6	+6.0	+8.2	+13.6	+25.0
9.0	8766	-80.0		-65.5	-51.2	-45.5	-39.8	-29.2	-12.0	-0.3	+3.9	+6.5	+8.8	+14.7	+23.0
10.0	8766	-108.0		-72.0	-56.2	-50.2	-43.9	-32.6	-13.7	-0.5	+4.5	+7.5	+10.1	+16.5	+30.0
11.0	8766	-83.0		-76.5	-61.6	-54.5	-47.9	-35.9	-15.8	-0.6	+4.9	+8.3	+11.7	+19.0	+32.0
12.0	8766	-87.0		-78.7	-63.7	-56.6	-50.1	-38.0	-18.3	-1.1	+5.2	+9.1	+12.9	+20.7	+34.0
13.0	8766	-85.0		-75.8	-60.8	-55.3	-49.2	-38.3	-19.9	-1.7	+5.2	+9.4	+13.1	+21.6	+41.0
14.0	8766	-79.0		-69.0	-56.1	-50.6	-45.3	-35.8	-19.4	-1.7	+4.9	+8.6	+11.8	+20.0	+29.0
15.0	8766	-67.0		-59.5	-49.5	-44.9	-39.9	-31.1	-16.6	-0.7	+4.7	+7.5	+10.4	+18.4	+27.0
16.0	8766	-58.0		-51.0	-43.1	-38.6	-34.0	-26.4	-12.8	+0.4	+4.9	+6.8	+8.6	+13.2	+20.0
17.0	8766	-57.0		-43.6	-35.8	-32.2	-28.3	-21.4	-8.7	+2.4	+5.9	+7.6	+9.0	+12.5	+17.0
18.0	8766	-56.0		-35.0	-28.6	-25.9	-22.2	-15.8	-4.9	+4.4	+7.7	+9.1	+10.5	+14.0	+18.0
19.0	8766	-42.0		-31.0	-23.2	-20.1	-16.5	-10.8	-1.4	+6.4	+9.6	+10.9	+12.2	+14.8	+20.0
20.0	8766	-36.0		-26.6	-19.1	-15.8	-12.4	-7.2	+1.2	+8.3	+11.9	+13.6	+15.1	+18.4	+24.0
21.0	8766	-28.0		-23.0	-16.4	-13.4	-10.4	-5.6	+1.2	+10.0	+13.8	+15.7	+17.4	+20.4	+29.0
22.0	8766	-38.0		-23.3	-15.5	-12.7	-9.8	-4.8	+2.1	+11.2	+15.2	+17.0	+18.6	+22.4	+34.0
23.0	8766	-33.0		-23.5	-16.1	-13.0	-9.8	-4.7	+2.8	+12.1	+15.9	+18.0	+19.4	+23.0	+39.0
24.0	8766	-34.0		-25.0	-17.6	-14.3	-11.0	-5.4	+3.1	+12.9	+17.0	+18.7	+20.3	+23.7	+37.0
25.0	8766	-35.0		-28.0	-19.8	-16.6	-12.8	-6.6	+2.8	+13.5	+17.9	+19.6	+21.7	+25.6	+35.0
26.0	8766	-41.0		-31.0	-22.6	-18.6	-15.0	-7.7	+2.6	+13.9	+18.5	+20.6	+22.7	+26.9	+33.0
27.0	8766	-42.0		-30.3	-23.6	-20.0	-16.9	-9.2	+2.5	+14.4	+19.2	+21.5	+23.6	+29.7	+40.0
28.0	1199	-29.8		-24.7	-23.7	-21.1	-18.0	-10.4	1.5	16.1	20.1	21.0	24.0	25.9	27.3
29.0	1224	-38.6		-34.3	-26.0	-23.7	-20.4	-12.4	1.2	16.4	21.3	23.6	25.2	28.7	31.9
30.0	1246	-40.7		-34.3	-31.1	-26.5	-22.3	-14.0	2.0	17.0	22.4	24.7	26.4	30.7	36.4
31.0	1262	-40.4		-33.3	-29.0	-24.5	-20.5	-15.6	2.3	17.8	23.4	25.7	28.2	33.6	35.3
32.0	1278	-42.4		-35.1	-31.7	-27.4	-23.4	-18.4	1.1	17.7	24.0	27.1	29.7	34.3	41.3
33.0	1299	-53.1		-45.2	-39.0	-33.7	-30.3	-21.2	0.3	18.0	24.4	27.6	31.4	37.7	39.5
34.0	1316	-51.4		-50.2	-40.0	-36.3	-32.4	-23.1	-0.7	19.1	25.2	28.4	32.0	46.2	50.9
35.0	1330	-53.4		-52.2	-42.0	-38.5	-34.8	-24.4	-0.4	19.4	26.7	30.3	33.0	50.2	63.0
36.0	1333	-54.4		-53.2	-45.6	-40.4	-36.4	-24.4	-1.3	20.3	27.7	30.1	33.5	50.2	62.1
37.0	1339	-64.8		-60.2	-48.0	-43.4	-38.6	-28.5	-1.2	21.0	28.4	31.8	34.5	60.2	65.5
38.0	1346	-75.6		-65.7	-52.4	-45.3	-38.3	-27.1	-0.4	22.4	29.9	33.4	36.4	61.2	75.9
39.0	1355	-74.8		-72.2	-54.8	-44.0	-39.0	-28.1	-0.3	23.6	31.1	34.0	38.3	64.2	73.6
40.0	1357	-75.3		-74.4	-55.2	-45.3	-41.1	-29.0	-0.1	24.4	32.7	35.8	39.7	61.2	84.6
41.0	1357	-79.3		-74.2	-55.0	-47.7	-41.0	-30.7	0.1	25.3	33.7	38.9	41.2	59.6	85.8
42.0	1344	-70.2		-55.0	-49.0	-43.6	-38.4	-30.4	0.4	27.2	35.3	39.1	41.7	66.2	82.6
43.0	1338	-72.9		-68.2	-55.0	-51.0	-44.5	-31.5	0.9	29.2	37.4	40.4	44.0	63.2	94.5
44.0	1322	-80.8		-64.2	-57.4	-53.1	-45.0	-31.7	1.1	30.4	40.1	43.1	46.4	53.2	84.8
45.0	1305	-85.1		-79.2	-61.3	-56.7	-48.5	-31.7	1.2	32.1	42.4	46.4	50.5	60.2	80.5
46.0	1287	-86.0		-75.3	-64.8	-59.0	-52.1	-32.6	1.3	34.0	44.5	48.7	52.6	60.3	83.5
47.0	1261	-80.4		-76.3	-67.4	-62.1	-53.3	-33.4	1.7	35.5	46.0	51.1	54.4	59.3	81.9
48.0	1234	-82.1		-75.8	-70.8	-63.5	-56.2	-34.2	0.1	36.4	46.4	51.0	55.2	60.3	72.6
49.0	1216	-82.8		-81.6	-71.0	-64.4	-57.6	-35.3	-0.8	36.5	47.7	52.6	55.4	59.4	63.8
50.0	1174	-92.8		-85.4	-75.2	-68.0	-58.7	-38.2	-1.4	35.2	48.0	52.0	56.1	61.4	65.7
51.0	1131	-90.6		-98.5	-75.7	-68.3	-59.6	-38.5	-1.7	36.7	49.4	53.4	57.4	58.3	68.6
52.0	1071	-101.7		-95.4	-77.1	-69.0	-59.5	-40.3	-2.2	35.4	50.3	55.2	59.3	64.5	66.4
53.0	1011	-101.4		-97.6	-76.7	-73.0	-59.9	-42.3	-2.2	36.6	49.6	54.0	61.0	67.8	79.0
54.0	924	-102.3		-98.7	-77.4	-71.4	-61.4	-44.0	-3.1	36.9	48.0	54.3	61.4	69.7	85.5
55.0	840	-95.1		-89.0	-78.6	-72.0	-62.4	-44.7	-4.5	35.3	50.0	56.0	60.2	69.9	91.3
56.0	743	-97.8		-95.0	-84.2	-74.1	-63.3	-45.4	-5.3	35.4	51.7	54.3	59.4	65.0	69.0
57.0	640	-97.0		-86.6	-76.4	-67.0	-58.4	-49.4	-6.2	37.7	51.3	57.2	60.4	67.1	67.7
58.0	515	-105.6		-81.4	-73.3	-64.4	-57.0	-47.0	-6.4	37.4	51.3	59.1	61.0	64.4	69.4
59.0	393	-104.0		-84.5	-76.5	-67.1	-57.7	-45.7	-7.4	35.4	51.4	60.0	62.1	59.0	68.4
60.0	273	-105.3		-97.3	-79.0	-69.3	-60.7	-49.7	-6.4	39.4	53.0	60.0	69.4	71.7	72.0
61.0	188	-93.1		-85.1	-77.7	-70.3	-60.2	-50.2	-2.5	43.2	60.7	70.7	72.1	74.5	74.7
62.0	124	-94.0		-82.2	-81.2	-75.4	-68.7	-58.7	0.0	46.3	57.0	68.2	72.4	75.9	77.1
63.0	76	-97.6		-91.3	-81.2	-62.5	-53.0	-46.0	0.0	46.0	60.2	68.2	69.3	70.2	70.3
64.0	43	-130.2		-78.0	-77.5	-65.6	-55.6	-45.6	39.2	61.6	69.0	68.5	69.0	69.1	69.1
65.0	34	-64.3		-62.1	-63.0	-61.0	-59.7	-45.7	13.0	45.0	61.1	66.1	66.6	66.6	66.6
66.0	29	-64.6		-54.5	-54.5	-54.5	-54.5	-45.4	2.5	37.4	55.4	72.3	72.3	72.0	72.0
67.0	25	-91.5		-61.7	-64.0	-64.0	-64.0	-45.0	4.5	45.0	57.4	70.4	79.0	80.1	80.2
68.0	29	-116.7	Positive is wind from the right (120°)	-107.5	-81.4	-69.7	-59.7	-48.4	-2.5	30.4	50.4	51.3	51.5	51.7	51.7
69.0	24	-105.4	Negative is wind from the left (300°)	-107.7	-48.0	-45.0	-45.0	-45.0	22.0	42.5	43.0	43.2	43.4	43.4	43.4
70.0	25	-124.1		-107.7	-48.0	-45.0	-45.0	-45.0	31.0	40.4	42.4	43.1	43.4	43.4	43.4

DATA SOURCE											JANUARY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 744	-11.0	-9.9	-5.9	-5.8	-4.6	-2.6	-0.6	+1.6	+3.7	+4.6	+5.2	+7.9	+9.0			
1.0 744	-10.0	-15.9	-10.9	-10.9	-7.6	-3.6	-1.1	+8.3	+13.4	+15.6	+19.8	+24.9	+26.0			
2.0 744	-17.0	-9.1	-6.6	-4.2	-0.7	+4.2	+11.6	+18.2	+22.0	+24.5	+28.6	+33.9	+32.0			
3.0 744	-14.0	-11.9	-6.5	-3.7	-2.2	+0.8	+6.9	+14.8	+22.6	+24.5	+28.6	+33.9	+31.1			
4.0 744	-15.0	-12.9	-4.8	-2.6	-0.5	+2.2	+9.6	+18.9	+26.0	+30.0	+34.5	+40.9	+42.0			
5.0 744	-16.0	-14.9	-4.8	-2.0	-0.1	+4.2	+12.5	+22.9	+30.1	+35.0	+41.1	+44.9	+50.0			
6.0 744	-14.0	-8.9	-3.5	-1.6	+0.4	+6.1	+15.7	+26.9	+34.7	+39.5	+44.7	+51.9	+56.0			
7.0 744	-13.0	-11.9	-4.7	-0.9	+1.2	+7.8	+18.6	+31.6	+40.5	+47.0	+52.1	+56.9	+59.0			
8.0 744	-12.0	-10.9	-4.8	-1.3	+1.5	+9.8	+21.3	+35.4	+45.2	+51.7	+57.5	+66.9	+69.0			
9.0 744	-11.0	-7.8	-4.0	-1.7	+1.7	+10.5	+24.3	+39.3	+49.9	+55.6	+61.2	+68.9	+72.0			
10.0 744	-21.0	-16.9	-7.8	-2.5	+1.2	+12.5	+27.3	+43.5	+53.5	+62.0	+70.5	+77.9	+81.0			
11.0 744	-15.0	-11.9	-7.3	-3.0	+2.5	+13.4	+30.3	+47.2	+57.8	+65.5	+71.8	+83.9	+97.0			
12.0 744	-19.0	-14.9	-6.5	-1.0	+4.0	+15.9	+32.3	+48.5	+59.9	+65.7	+73.5	+80.9	+83.0			
13.0 744	-15.0	-7.9	-1.5	-2.4	+8.5	+18.3	+32.0	+47.1	+56.3	+61.6	+66.1	+79.9	+81.0			
14.0 744	-2.0	-1.2	+5.9	+8.9	+17.9	+29.4	+43.9	+53.7	+56.7	+63.5	+72.9	+75.0				
15.0 744	-4.0	-2.9	+3.2	+5.3	+9.0	+15.5	+27.0	+39.1	+46.9	+52.3	+57.5	+66.9	+72.0			
16.0 744	-3.0	-2.9	+0.8	+3.9	+7.5	+13.5	+23.0	+33.1	+40.1	+43.2	+46.5	+50.9	+54.0			
17.0 744	-3.0	-0.6	+1.1	+3.7	+9.7	+18.4	+27.1	+34.3	+37.8	+40.2	+44.9	+52.0				
18.0 744	-9.0	-6.9	-2.8	-0.8	+1.2	+6.4	+12.9	+20.9	+28.0	+31.5	+34.3	+37.9	+41.0			
19.0 744	-8.0	-3.7	-2.4	-0.5	+2.6	+8.3	+14.8	+21.7	+27.0	+31.1	+36.9	+44.0				
20.0 744	-9.0	-5.9	-4.6	-3.2	-0.0	+5.1	+11.3	+17.4	+19.5	+23.1	+28.9	+34.0				
21.0 744	-15.0	-14.9	-8.5	-7.0	-4.4	-0.9	+3.4	+9.0	+14.1	+18.0	+24.2	+32.9	+34.0			
22.0 744	-22.0	-16.9	-11.5	-8.2	-5.3	-2.0	+2.6	+8.3	+12.9	+18.0	+24.2	+32.9	+34.0			
23.0 744	-19.0	-18.9	-12.5	-9.2	-6.6	-2.6	+2.1	+8.4	+14.2	+19.5	+23.3	+33.9	+35.0			
24.0 744	-20.0	-19.9	-14.8	-11.0	-8.1	-3.0	+2.6	+8.9	+15.4	+19.6	+23.7	+31.9	+38.0			
25.0 744	-15.0	-13.1	-10.2	-7.9	-3.2	+3.4	+10.9	+16.6	+20.6	+25.7	+31.9	+33.0				
26.0 744	-22.0	-18.9	-13.9	-11.6	-8.6	-3.1	+4.3	+13.9	+20.9	+24.8	+29.8	+38.9	+45.0			
27.0 744	-21.0	-18.9	-15.8	-13.5	-10.3	-3.4	+4.9	+15.7	+24.2	+27.8	+34.2	+40.4	+41.0			
28.0 105	-14.2	-10.4	-10.4	-6.4	-0.2	7.8	17.1	23.4	26.0	28.4	28.7					
29.0 107	-19.6	-15.0	-14.9	-14.9	-5.9	-1.7	8.2	20.9	23.7	27.0	29.0	31.4	32.0			
30.0 104	-23.8	-19.0	-17.5	-12.9	-1.7	13.2	26.7	32.0	34.4	36.1	36.7	36.4				
31.0 109	-23.8	-22.0	-21.4	-14.7	-2.0	14.4	28.0	34.4	36.1	36.7	36.4					
32.0 113	-31.2	-36.4	-36.4	-26.4	-21.1	-0.8	15.4	27.0	34.1	36.1	36.7	36.4				
33.0 115	-34.4	-38.4	-38.4	-38.4	-28.1	-0.1	17.3	27.0	34.2	39.4	44.4	45.4	45.5			
34.0 117	-40.8	-42.4	-42.4	-35.7	-20.2	-1.3	16.5	28.5	35.2	40.4	45.4	46.9	47.0			
35.0 116	-42.5	-45.4	-45.4	-38.4	-30.1	-1.2	18.0	29.0	35.5	45.4	46.4	47.4	48.0			
36.0 114	-48.7	-43.0	-40.7	-35.3	-0.0	18.5	29.5	35.4	46.4	48.4	49.2	49.3				
37.0 119	-50.0	-44.8	-44.8	-44.8	-37.1	-1.4	19.4	32.1	40.1	44.4	50.4	51.5	51.5			
38.0 115	-50.6	-46.7	-46.7	-46.7	-33.1	-2.0	19.5	30.1	42.2	47.4	53.4	53.4	53.4			
39.0 117	-48.8	-44.0	-44.0	-44.0	-20.3	-2.0	18.5	30.5	45.3	52.0	55.4	55.4	55.4			
40.0 115	-45.4	-44.0	-44.0	-44.0	-18.3	-2.5	18.4	35.0	49.0	58.2	59.0	60.4	60.6			
41.0 117	-44.7	-44.0	-44.0	-44.0	-18.4	-2.4	23.3	39.4	49.5	63.2	63.0	71.5	71.6			
42.0 114	-52.0	-44.0	-44.0	-44.0	-17.5	-1.4	24.0	40.5	53.5	57.2	62.0	75.4	75.9			
43.0 113	-50.9	-44.0	-44.0	-44.0	-18.7	0.4	24.0	44.2	58.4	62.4	66.0	77.4	78.1			
44.0 113	-56.6	-44.0	-44.0	-44.0	-17.8	-0.2	27.4	45.2	50.4	63.4	66.0	80.1	80.3			
45.0 111	-60.2	-44.0	-44.0	-44.0	-19.5	-0.1	30.0	45.4	54.0	67.7	71.0	80.4	80.9			
46.0 110	-57.0	-44.0	-44.0	-44.0	-20.0	1.0	31.5	47.7	58.4	68.4	75.0	80.4	80.2			
47.0 106	-58.7	-44.0	-44.0	-44.0	-20.2	2.1	31.5	47.7	58.4	68.4	75.0	80.4	80.2			
48.0 104	-52.6	-44.0	-44.0	-44.0	-21.6	0.0	30.5	49.0	59.4	67.0	74.1	79.4	75.0			
49.0 100	-57.9	-44.0	-44.0	-44.0	-16.4	5.1	32.3	51.0	61.4	70.1	74.2	79.4	75.0			
50.0 100	-60.3	-44.0	-44.0	-44.0	-15.4	5.2	35.0	53.0	64.4	74.0	76.1	76.5	76.5			
51.0 95	-61.5	-44.0	-44.0	-44.0	-13.4	5.6	36.0	54.4	64.4	73.4	82.4	83.2	83.3			
52.0 88	-59.2	-44.0	-44.0	-44.0	-16.7	-10.1	39.4	60.0	72.1	72.0	87.4	88.0	88.1			
53.0 83	-56.9	-44.0	-44.0	-44.0	-16.4	-7.7	44.0	64.7	70.7	91.0	92.4	92.4	93.0			
54.0 72	-27.4	-44.0	-44.0	-44.0	-9.7	-8.1	40.0	64.4	97.7	116.4	116.7	116.0	117.0			
55.0 64	-20.6	-44.0	-44.0	-44.0	7.9	39.0	73.1	95.1	96.4	96.4	96.4	96.4	96.4			
56.0 57	-21.1	-44.0	-44.0	-44.0	10.5	39.0	57.4	66.5	66.0	67.1	67.2	67.2	67.2			
57.0 46	-14.9	-44.0	-44.0	-44.0	11.1	39.5	58.0	66.5	66.0	67.1	67.2	67.2	67.2			
58.0 26	-18.1	-44.0	-44.0	-44.0												
59.0 14	-14.4	-44.0	-44.0	-44.0												
60.0 10	-9.9	-44.0	-44.0	-44.0												
61.0 7	-6.3	-44.0	-44.0	-44.0												
62.0 6	16.2	-44.0	-44.0	-44.0												
63.0 5	15.2	-44.0	-44.0	-44.0												
64.0 4	12.2	-44.0	-44.0	-44.0												
65.0 3	19.2	-44.0	-44.0	-44.0												
66.0 3	6.3	-44.0	-44.0	-44.0												
67.0 3	19.7	-44.0	-44.0	-44.0												
68.0 4	15.7	-44.0	-44.0	-44.0												
69.0 4	14.0	-44.0	-44.0	-44.0												
70.0 4	16.7	-44.0	-44.0	-44.0												

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.2

DATA SOURCE							FEBRUARY								
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE	FREQUENCY	95,000	97,720	99,000	99,885	MAX SPEED	DIR (DEG)
5FC	678	79.0			-4.7	-5.6	-4.4	-2.5	-0.4	+1.9	+4.3	+6.0	+7.7	+9.5	+10.0
1.0	678	15.0			-10.4	-9.5	-8.5	-7.5	-6.5	+2.8	+7.2	+15.6	+18.4	+20.8	+27.0
2.0	678	12.0			-7.4	-5.7	-3.3	-0.1	5.3	+12.7	+19.4	+23.5	+24.0	+31.0	+32.0
3.0	678	10.0			-5.7	-3.5	-1.6	+1.6	8.3	+16.8	+24.2	+26.5	+29.1	+37.5	+38.0
4.0	678	8.0			-6.1	-1.9	0.5	+3.2	10.3	+20.4	+27.6	+31.6	+35.1	+43.0	+44.0
5.0	678	11.0			-3.7	-1.9	0.1	+4.7	+13.6	+24.6	+32.5	+36.7	+39.6	+47.0	+50.0
6.0	678	12.0			-4.6	-1.8	0.5	+5.9	+17.2	+29.2	+37.2	+42.3	+44.7	+57.0	+58.0
7.0	678	11.0			-4.6	-1.6	0.9	+7.0	+19.9	+32.0	+43.7	+48.2	+53.2	+59.0	+60.0
8.0	678	10.0			-5.2	-3.1	1.9	+8.3	+22.0	+37.5	+49.0	+54.5	+60.1	+77.0	+78.0
9.0	678	18.0			-10.1	-5.1	1.6	+9.5	+25.5	+41.6	+54.4	+61.6	+64.5	+72.0	+73.0
10.0	678	19.0			-11.2	-7.5	0.7	+10.2	+28.6	+46.7	+57.3	+63.2	+69.2	+82.0	+83.0
11.0	678	34.0			-12.2	-5.2	1.7	+11.6	+30.8	+50.4	+61.7	+69.1	+74.2	+91.0	+91.0
12.0	678	28.0			-7.6	-0.2	3.3	+13.3	+31.1	+51.8	+62.7	+70.2	+78.2	+90.0	+91.0
13.0	678	19.0			-3.2	2.1	7.2	+15.8	+32.2	+49.8	+63.2	+70.7	+74.2	+80.0	+81.0
14.0	678	16.0			-2.2	2.4	9.3	+15.5	+29.6	+48.8	+55.0	+61.7	+66.8	+75.0	+76.0
15.0	678	15.0			-0.2	5.4	8.1	+13.6	+26.6	+39.2	+47.7	+51.6	+54.6	+58.0	+59.0
16.0	678	16.0			-2.2	8.4	6.9	+12.5	+22.3	+34.4	+40.3	+42.9	+45.7	+55.0	+56.0
17.0	678	22.0			-0.7	0.9	3.9	+9.2	+17.6	+27.1	+33.6	+37.9	+39.2	+52.0	+53.0
18.0	678	15.0			-5.6	-0.6	0.8	+5.6	+12.0	+21.5	+27.6	+32.2	+36.6	+40.6	+41.0
19.0	678	13.0			-5.2	-2.3	0.6	+2.0	+7.5	+15.5	+23.0	+26.0	+28.0	+41.0	+42.0
20.0	678	12.0			-8.5	-5.6	3.7	-0.8	+3.8	+10.8	+16.7	+20.6	+22.8	+37.0	+38.0
21.0	678	17.0			-12.1	-9.1	6.4	-2.5	+1.3	+12.6	+19.8	+21.3	+29.0	+30.0	+31.0
22.0	678	21.0			-14.2	-10.8	8.0	-3.4	+0.0	+5.7	+10.1	+13.1	+16.4	+30.0	+31.0
23.0	678	20.0			-13.6	-10.8	8.6	-4.1	+0.0	+5.4	+10.5	+13.3	+16.5	+20.5	+21.0
24.0	678	18.0			-15.4	-12.6	9.1	-4.2	+0.4	+5.9	+9.9	+12.5	+14.0	+16.0	+17.0
25.0	678	21.0			-16.4	-13.9	10.0	-5.0	+0.5	+6.5	+10.0	+12.9	+14.4	+20.0	+21.0
26.0	678	29.0			-16.0	-13.0	10.5	-5.2	+0.8	+7.0	+11.5	+14.4	+16.1	+23.0	+24.0
27.0	678	37.0			-16.2	-13.1	10.4	-4.6	+1.3	+7.9	+13.1	+15.2	+20.1	+24.0	+25.0
28.0	82	-0.2					-7.9	-1.5	3.9	12.4	16.9	20.1	22.2	22.9	22.9
29.0	82	-11.4					-10.1	-1.0	6.1	19.0	18.5	20.1	22.2	23.2	23.3
30.0	81	-12.8					-11.7	-0.9	9.4	17.4	21.0	24.1	24.4	25.4	25.4
31.0	81	-11.5					-10.2	-0.8	2.0	13.2	20.7	25.7	28.1	29.1	29.2
32.0	81	-15.0					-13.2	-5.0	2.6	17.1	28.6	31.0	34.9	42.2	43.0
33.0	84	-16.2					-0.0	-6.3	1.7	17.0	25.7	32.2	37.1	37.7	37.4
34.0	94	-0.4					-8.6	-7.6	0.0	15.5	24.7	31.4	33.0	36.0	36.6
35.0	100	-18.4					-19.0	-10.7	-8.0	17.7	28.6	32.7	34.7	36.0	37.4
36.0	102	-21.3					-13.0	-11.7	-7.9	-0.6	14.0	24.6	34.0	37.6	39.1
37.0	105	-22.4					-13.0	-12.4	-7.9	1.7	15.6	24.8	33.0	35.4	41.7
38.0	107	-27.0					-21.0	-18.6	-10.6	1.5	16.3	26.0	34.4	41.4	42.4
39.0	109	-22.7					-29.0	-16.5	-10.6	2.8	17.2	26.7	36.4	37.0	50.4
40.0	109	-24.6					-22.0	-20.5	-9.6	3.6	17.4	27.2	37.4	40.6	61.7
41.0	112	-24.3					-16.5	-9.4	5.2	19.0	28.7	40.4	54.5	62.4	61.9
42.0	109	-25.0					-19.0	-17.5	6.6	20.5	39.2	46.5	58.4	69.6	69.6
43.0	104	-20.8					-19.0	-15.5	8.3	6.6	21.7	35.0	44.2	70.5	70.5
44.0	106	-30.7					-25.0	-13.6	4.7	7.6	23.5	30.6	51.4	70.4	72.5
45.0	106	-31.1					-23.9	-8.6	2.7	10.8	26.4	42.2	51.7	75.9	77.0
46.0	102	-31.7					-19.0	-2.9	0.1	13.7	27.0	44.9	57.4	78.0	81.2
47.0	102	-28.3					-15.0	-1.7	1.1	14.7	24.2	46.4	57.0	80.0	80.6
48.0	94	-29.1					-0.4	2.0	15.5	29.0	45.2	57.4	69.0	75.0	76.0
49.0	94	-31.4					1.2	4.4	19.0	30.5	47.9	57.3	64.4	70.4	71.1
50.0	90	-36.1					2.0	5.5	17.5	29.5	46.7	57.5	67.0	72.1	72.9
51.0	83	-39.7					-0.1	6.2	19.1	31.5	43.8	60.9	70.1	75.1	73.5
52.0	80	-42.5					-5.2	6.0	20.9	32.7	48.3	63.0	72.9	74.1	74.2
53.0	74	-44.6					-0.4	8.7	23.2	35.3	51.3	63.7	69.4	73.3	74.1
54.0	66	-49.2					-11.5	13.3	24.2	38.0	57.5	62.9	71.6	77.6	78.5
55.0	60	-37.3					12.4	18.5	23.5	41.0	60.1	70.0	79.4	82.6	83.4
56.0	50	-30.3					13.1	16.5	25.5	43.7	59.1	75.5	86.0	92.4	92.4
57.0	44	-35.0					8.0	14.3	28.6	44.8	62.0	77.4	88.0	112.4	113.1
58.0	39	-25.5						5.0	29.2	42.8	57.8	76.1	87.1	87.4	87.7
59.0	27	7.1						19.4	37.1	48.5	60.7	71.7	83.6	83.0	84.2
60.0	20	-7.0						-2.0	34.2	59.0	68.4	75.0	75.7	76.3	75.4
61.0	11	-4.3						37.1	51.5	75.0	79.2	79.6	79.6	79.6	79.6
62.0	7	-16.0						26.1	72.5	76.9	82.4	82.4	82.4	82.4	82.9
63.0	4	34.9							63.0	90.4	99.7	99.7	99.4	99.4	99.4
64.0	2	60.6							61.0	75.4	75.6	75.6	75.6	75.6	75.6
65.0	1	57.9													57.9
66.0	2	46.2							46.0	51.5	53.7	53.7	53.7	53.7	53.7
67.0	1	94.8													94.8
68.0	3	60.3							90.5	117.5	117.4	117.0	117.0	117.0	117.9
69.0	1	99.5							51.5	85.3	85.4	85.6	85.6	85.6	85.5
70.0	1	41.0							66.3	66.0	67.1	67.1	67.2	67.2	67.2
Positive is wind from the tail (225°) Negative is wind from the head (45°)															

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.3

DATA SOURCE										MARCH						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED
5FC 744	-10.0	-7.9	-10.0	-7.9	-10.0	-7.0	-2.6	-0.5	+1.8	+3.9	+5.5	+6.6	+9.4	+10.0		
1.0 744	-16.0	-15.9	-12.9	-10.0	-7.0	-2.6	-0.5	+2.2	+8.6	+13.3	+15.7	+19.2	+24.9	+26.0		
2.0 744	-13.0	-11.9	-9.2	-5.9	-3.7	-0.6	+4.2	+11.7	+17.7	+20.0	+21.9	+28.9	+34.0			
3.0 744	-15.0	-13.9	-8.5	-4.2	-2.3	+0.4	+6.5	+14.9	+20.8	+23.6	+25.8	+35.9	+46.0			
4.0 744	-16.0	-13.9	-7.7	-3.7	-1.2	+1.7	+9.0	+17.8	+24.3	+27.7	+33.5	+45.9	+58.0			
5.0 744	-18.0	-16.9	-7.2	-2.0	+0.6	+3.9	+11.7	+21.2	+28.2	+31.5	+41.2	+66.9	+84.0			
6.0 744	-21.0	-17.9	-5.5	-2.3	+1.0	+5.6	+14.4	+25.5	+32.6	+36.0	+43.5	+56.9	+70.0			
7.0 744	-22.0	-21.9	-10.2	-2.0	+1.7	+7.7	+17.3	+28.5	+38.0	+44.0	+50.5	+63.9	+70.0			
8.0 744	-22.0	-21.9	-10.5	-2.0	+2.3	+9.1	+20.1	+32.3	+41.9	+47.7	+56.5	+63.9	+72.0			
9.0 744	-22.0	-26.9	-6.5	-1.6	+2.7	+10.9	+22.4	+35.8	+47.4	+56.0	+62.5	+75.9	+79.0			
10.0 744	-30.0	-25.9	-8.5	-2.6	+2.5	+12.3	+25.5	+40.0	+51.6	+60.5	+66.5	+76.9	+86.0			
11.0 744	-33.0	-26.9	-7.2	-0.8	+3.5	+13.4	+27.3	+43.6	+54.7	+65.0	+70.5	+93.9	+102.0			
12.0 744	-26.0	-25.9	-4.5	+2.3	+7.1	+15.5	+29.9	+44.8	+57.4	+66.0	+77.5	+94.9	+99.0			
13.0 744	-18.0	-17.9	-3.2	+5.2	+10.1	+17.9	+30.2	+44.3	+53.3	+62.0	+73.2	+85.9	+94.0			
14.0 744	-15.0	-15.9	-1.5	+6.3	+10.8	+17.5	+27.7	+39.9	+48.9	+55.0	+69.7	+86.9	+95.0			
15.0 744	-11.0	-12.9	-0.8	+4.9	+9.1	+16.1	+24.4	+34.4	+43.2	+50.7	+60.9	+67.0				
16.0 744	-7.0	-5.9	-0.2	+2.7	+6.9	+13.2	+21.3	+29.1	+35.3	+40.2	+43.5	+51.9	+57.0			
17.0 744	-13.0	-3.9	-0.9	+1.1	+4.8	+9.4	+16.9	+24.9	+31.4	+34.0	+36.8	+44.9	+46.0			
18.0 744	-6.0	-4.9	-0.3	+0.3	+1.5	+5.1	+11.3	+18.7	+25.3	+28.2	+30.6	+37.4	+38.0			
19.0 744	-12.0	-10.9	-5.7	-2.4	+0.9	+1.4	+6.3	+13.1	+18.4	+22.5	+26.5	+33.9	+35.0			
20.0 744	-15.0	-12.9	-7.1	-5.5	-3.5	-0.6	+3.0	+8.7	+14.4	+17.0	+21.3	+29.9	+34.0			
21.0 744	-16.0	-15.9	-10.5	-8.5	-6.2	-2.7	+0.9	+6.1	+10.3	+12.0	+17.7	+20.9	+26.0			
22.0 744	-23.0	-20.9	-10.8	-9.1	-6.8	-3.7	+0.0	+4.4	+8.4	+11.5	+16.1	+20.9	+24.0			
23.0 744	-21.0	-20.9	-14.5	-11.0	-8.0	-4.7	-0.6	+3.5	+7.2	+9.3	+13.5	+18.9	+24.0			
24.0 744	-26.0	-23.9	-17.2	-13.2	-8.9	-5.3	-0.6	+3.7	+7.2	+9.5	+11.9	+14.9	+16.0			
25.0 744	-25.0	-22.9	-19.2	-14.2	-9.7	-5.7	-0.5	+4.1	+8.4	+10.8	+14.2	+17.9	+21.0			
26.0 744	-27.0	-26.9	-17.8	-12.6	-9.3	-5.7	-0.3	+5.3	+10.2	+12.7	+15.9	+20.9	+23.0			
27.0 744	-37.0	-31.9	-17.0	-11.1	-5.4	-0.0	+5.8	+10.6	+15.1	+16.9	+25.9	+28.0				
28.0 80	-12.5	-8.5	-5.5	-0.4	5.1	11.7	13.0	16.0	22.1	22.6	22.7					
29.0 93	-13.5	-8.0	-2.8	0.4	5.4	14.6	17.1	18.0	21.1	23.8	23.9					
30.0 97	-15.9	-7.8	-3.1	1.3	7.6	16.8	17.5	20.8	23.0	24.5	24.5					
31.0 98	-18.2	-5.8	-2.5	1.0	9.0	18.6	20.2	22.0	24.0	25.0	25.0					
32.0 101	-20.5	-9.0	-6.7	-3.7	2.3	9.4	20.2	25.5	27.0	28.0	29.0	31.0	31.1			
33.0 103	-22.4	-8.0	-7.3	-3.0	1.8	7.7	20.4	25.0	28.4	29.0	31.0	31.1				
34.0 103	-22.2	-9.0	-7.7	-4.9	1.3	9.1	20.7	27.2	27.0	28.0	31.0	31.1				
35.0 104	-10.9	-17.0	-6.8	-2.8	1.8	7.0	16.7	23.6	26.6	27.6	28.0	28.1				
36.0 104	-19.4	-10.5	-4.3	1.1	9.3	17.0	23.6	26.6	26.6	26.6	26.6	26.6				
37.0 113	-20.8	-18.0	-6.4	-2.8	2.0	8.2	17.7	23.6	27.0	28.0	31.7	31.8				
38.0 113	-23.1	-15.0	-8.4	-3.4	1.6	8.0	17.3	23.6	27.0	27.0	33.8	33.9				
39.0 114	-20.6	-0.0	-6.3	-4.3	1.7	9.7	18.0	24.3	29.0	32.0	35.1	35.4				
40.0 115	-34.6	-7.8	-6.4	-4.1	1.6	11.3	20.3	26.4	32.0	32.0	41.6	41.7				
41.0 115	-36.5	-10.8	-6.4	-1.7	1.8	12.8	20.4	28.2	34.0	35.8	46.0	46.1				
42.0 116	-34.8	-12.8	-7.4	-4.1	2.4	12.6	22.5	29.2	33.0	37.8	50.5	50.5				
43.0 116	-31.9	-11.0	-6.4	-0.3	5.0	13.7	23.5	33.3	34.0	41.0	50.8	51.0				
44.0 113	-27.7	-9.0	-6.4	-0.4	7.2	15.2	24.5	35.4	39.7	43.0	48.6	48.7				
45.0 111	-22.4	-8.0	-5.5	1.3	7.7	16.6	26.3	36.7	44.2	48.0	48.6	46.7				
46.0 110	-17.0	-7.0	-7.2	1.5	10.1	18.1	29.1	36.4	44.2	45.0	46.6	46.7				
47.0 108	-11.8	-8.0	-6.5	4.3	13.0	21.0	31.8	40.7	45.4	46.0	50.0	50.2				
48.0 107	-0.3	-8.0	-6.5	4.3	13.0	21.0	31.8	40.7	45.4	46.0	50.0	50.2				
49.0 105	-10.9	-10.8	-8.6	0.2	15.2	24.6	33.8	43.4	48.4	50.0	52.1	52.3				
50.0 102	-9.0	-8.7	-8.7	1.1	15.8	26.4	35.2	41.0	47.7	50.0	55.7	55.9				
51.0 97	-7.2		4.9	16.5	27.1	35.6	45.2	53.8	56.0	57.1	57.3					
52.0 94	-8.6		10.4	17.0	26.0	37.4	47.7	52.0	56.0	56.5	56.6					
53.0 87	-15.5		-12.0	9.4	15.8	26.7	37.2	50.2	56.0	56.2	57.1	57.3				
54.0 80	-16.2			7.5	16.8	29.0	37.7	45.0	47.7	54.2	55.0	55.2				
55.0 69	-19.8		-13.4	4.5	14.0	29.5	38.5	46.9	48.4	50.2	50.7	50.8				
56.0 60	-8.2		0.4	8.0	19.5	30.7	39.2	47.0	48.4	50.8	50.0	50.0				
57.0 51	-8.4		7.2	13.6	21.1	33.3	40.5	46.5	53.8	57.4	57.9	58.0				
58.0 41	-0.7			10.1	25.3	33.5	48.2	52.0	54.1	54.7	55.1	55.2				
59.0 32	7.8				29.1	35.0	48.3	58.4	65.0	65.3	66.3	66.3				
60.0 22	19.9				24.1	33.2	41.0	55.5	62.0	65.7	66.0	66.3				
61.0 14	-13.1					35.1	39.7	48.8	64.4	65.0	65.2	65.4				
62.0 10	19.0					34.3	40.5	54.4	58.4	58.6	58.7	58.8				
63.0 7	15.5					29.1	35.5	48.0	68.6	68.6	68.6	68.9				
64.0 4	26.6					44.5	75.1	76.0	76.1	76.2	76.3	76.3				
65.0 3	19.5					30.5	40.5	40.8	40.0	40.0	40.0	40.9				
66.0 2	-0.2					0.0	15.5	15.8	15.0	15.0	15.8	15.8				
67.0 1	-6.7															
68.0 1	-3.1															
69.0 1	-1.9															
70.0 1	-0.7															

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.4

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	-9.0			-7.4	-6.2	-4.9	-3.3	-0.7	1.4	3.4	4.9	6.9	11.0	12.0	
10	720	-13.0			-10.6	-9.2	-7.1	-3.9	-0.0	5.5	11.5	15.7	18.4	20.8	21.0	
20	720	-16.0			-11.5	-9.1	-6.8	-3.2	0.9	7.4	13.6	18.5	20.3	24.5	25.0	
30	720	-19.0			-11.3	-8.7	-6.5	-3.0	2.0	9.1	17.2	21.5	23.9	28.0	29.0	
40	720	-18.0			-12.3	-9.2	-6.7	-2.6	3.2	11.8	19.8	23.2	27.8	36.0	37.0	
50	720	-18.0			-10.3	-8.2	-5.7	-1.7	4.5	14.4	23.1	29.1	33.4	41.0	42.0	
60	720	-22.0			-9.6	-8.2	-5.9	-1.0	6.1	17.3	27.0	32.1	35.7	45.0	46.0	
70	720	-16.0			-10.9	-9.1	-5.9	-0.8	7.8	20.0	29.8	35.8	41.6	49.0	50.0	
80	720	-20.0			-11.2	-9.1	-5.7	-0.4	9.5	22.9	32.6	39.7	46.4	60.0	61.0	
90	720	-20.0			-11.3	-9.2	-6.3	-0.6	11.1	26.7	38.6	43.9	50.9	78.0	79.0	
100	720	-32.0			-14.7	-12.2	-7.3	-0.6	12.3	30.8	43.2	49.5	52.9	77.0	78.0	
110	720	-33.0			-16.9	-12.5	-8.0	-0.5	14.5	35.1	46.6	53.1	57.4	75.0	76.0	
120	720	-36.0			-17.5	-13.6	-7.8	-0.2	15.9	38.2	49.2	54.5	61.8	79.0	80.0	
130	720	-34.0			-16.9	-9.6	-6.1	2.0	18.0	37.9	47.8	54.7	58.9	68.0	69.0	
140	720	-25.0			-14.7	-9.9	-4.6	3.3	18.4	34.5	43.4	50.1	53.9	59.5	60.0	
150	720	-17.0			-11.8	-6.2	-2.6	3.5	16.3	30.0	36.8	40.5	44.4	51.0	52.0	
160	720	-15.0			-9.4	-3.9	-1.8	2.2	12.8	24.1	30.2	34.8	39.7	45.0	46.0	
170	720	-16.0			-8.8	-5.7	-3.2	-0.0	9.3	18.7	25.1	29.3	32.8	40.0	41.0	
180	720	-21.0			-10.8	-7.5	-5.7	-1.0	5.2	12.6	18.6	23.3	27.4	27.5	28.0	
190	720	-15.0			-10.9	-8.8	-7.1	-3.5	1.5	8.3	13.5	17.3	21.2	36.0	37.0	
200	720	-15.0			-11.2	-9.6	-7.8	-4.8	-0.3	4.7	9.7	13.3	16.9	23.6	24.0	
210	720	-17.0			-11.2	-10.1	-8.5	-5.6	-1.1	2.3	6.1	8.4	10.9	19.0	20.0	
220	720	-12.0			-10.8	-9.7	-8.6	-6.3	-2.2	1.4	4.4	5.9	8.2	13.0	14.0	
230	720	-13.0			-12.3	-10.7	-8.8	-6.4	-2.6	0.7	3.7	5.6	6.8	9.6	10.0	
240	720	-16.0			-12.7	-11.8	-10.0	-7.0	-2.6	1.0	4.3	5.9	7.4	8.8	9.0	
250	720	-19.0			-13.6	-12.5	-10.9	-7.4	-2.5	1.7	5.4	7.5	8.7	12.0	13.0	
260	720	-19.0			-17.1	-14.1	-11.7	-7.5	-1.8	2.3	6.3	8.5	9.7	14.5	15.0	
270	720	-18.0			-16.3	-13.6	-11.5	-7.3	-1.1	3.3	6.8	9.3	11.2	16.0	17.0	
280	90	-18.4				-13.0	-11.6	-6.3	1.2	5.5	12.1	14.4	17.0	18.1	19.3	
290	90	-13.3				-11.4	-10.1	-5.3	1.0	4.4	13.1	15.4	16.0	17.1	17.2	
300	101	-13.2			-13.0	-10.8	-9.4	-5.3	2.0	9.7	15.4	16.0	19.0	19.0	20.1	
310	107	-17.1			-11.0	-10.6	-8.9	-5.3	4.1	11.0	15.0	19.3	20.0	20.6	20.7	
320	104	-12.7			-11.0	-10.6	-9.2	-5.4	3.7	11.7	16.9	17.0	19.0	21.8	22.0	
330	104	-12.9			-12.0	-11.4	-10.6	-5.4	3.4	14.2	17.4	19.4	19.0	23.1	23.3	
340	109	-15.2				-13.8	-9.6	-5.6	3.5	12.0	19.4	22.4	24.7	25.3	25.6	
350	110	-19.8			-14.0	-13.7	-11.6	-5.5	2.7	12.6	19.8	21.4	22.0	24.6	24.7	
360	112	-25.1			-16.0	-13.5	-10.4	-4.7	2.4	11.8	15.0	19.4	20.0	24.6	24.7	
370	112	-24.6			-17.0	-13.8	-10.4	-4.8	3.4	10.5	18.7	15.0	21.2	21.4	21.8	
380	114	-24.1			-15.0	-14.0	-10.6	-5.0	3.0	11.2	15.3	18.7	19.0	21.7	21.9	
390	112	-26.6			-15.0	-13.8	-10.4	-5.2	4.3	10.7	15.7	20.0	20.0	22.6	22.6	
400	112	-27.2			-16.0	-14.7	-9.7	-5.4	4.0	12.1	14.4	21.4	22.0	23.4	23.7	
410	113	-24.5			-13.0	-11.7	-10.4	-7.0	3.6	12.0	19.3	25.4	28.0	30.0	30.2	
420	112	-24.0			-13.0	-12.5	-10.6	-6.1	2.3	20.0	19.4	28.4	28.0	33.6	33.7	
430	112	-22.8			-19.0	-13.6	-11.7	-5.8	2.5	11.6	21.4	30.4	35.4	36.2	36.3	
440	111	-19.1			-16.0	-16.2	-11.4	-6.8	3.0	14.7	22.4	32.4	35.0	41.1	41.2	
450	110	-16.5			-15.0	-14.5	-9.8	-6.1	4.2	15.4	20.4	33.4	38.0	45.4	45.6	
460	107	-16.2				-13.5	-11.6	-4.0	6.1	16.5	28.7	35.4	46.2	49.3	49.5	
470	105	-15.7			-15.7	-12.4	-8.7	-4.5	6.2	15.4	31.4	39.4	44.0	46.6	46.7	
480	103	-15.9			-15.0	-12.7	-9.4	-5.3	5.2	17.8	31.0	41.7	42.7	43.3	43.4	
490	103	-17.0			-16.0	-12.7	-10.8	-3.0	6.2	15.3	30.0	40.7	42.7	43.3	43.4	
500	100	-13.7			-14.0	-11.4	-9.0	-4.4	6.2	16.1	35.0	40.7	42.4	43.1	43.2	
510	101	-11.7				-8.0	-8.4	-5.0	5.4	17.1	36.5	41.8	42.0	43.1	43.3	
520	98	-14.8			-11.0	-11.0	-11.0	-3.2	5.7	16.7	39.1	40.8	41.0	41.4	41.5	
530	92	-15.0				-13.0	-7.7	-2.5	7.2	17.7	32.0	39.0	42.1	42.6	42.7	
540	80	-14.5			-12.2	-7.0	-1.3	4.5	22.3	31.0	39.2	45.3	46.3	46.3	46.5	
550	76	-19.1			-13.3	-10.2	0.4	0.2	23.3	38.3	42.3	48.2	49.0	49.0	49.0	
560	63	-18.4			-13.6	-5.9	-0.5	9.5	25.0	39.0	47.4	48.4	49.3	49.3	49.3	
570	52	-16.8			-11.0	-6.7	-0.0	10.0	28.2	40.8	45.8	46.3	46.6	46.7	46.7	
580	44	-19.8				-9.7	-1.9	-1.9	10.0	27.0	40.7	54.0	67.4	67.8	67.9	
590	34	-19.8				-10.2	-0.4	1.2	26.2	34.3	50.3	50.3	51.2	51.3	51.3	
600	25	-19.8				-8.7	-2.0	14.2	29.0	38.4	51.3	51.3	51.6	51.6	51.6	
610	14	-19.8					6.4	-1.0	24.0	31.3	31.3	32.0	32.0	32.1	32.1	
620	8	-6.6					-5.7	3.0	24.7	44.7	46.7	47.1	47.2	47.2	47.2	
630	4	3.0						20.0	35.4	36.2	37.1	37.1	37.2	37.2	37.2	
640	3	-17.1						-2.0	37.4	37.4	38.1	38.1	38.2	38.2	38.2	
650	2	-12.8						-1.0	-2.1	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	
660	2	-20.7						-21.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	
670	2	-4.5						-4.0	1.7	1.0	1.0	2.0	2.0	2.0	2.0	
680	2	-26.2						-26.0	-14.1	-13.4	-13.7	-13.4	-13.6	-13.6	-13.6	
690	2	-25.5						-25.0	-16.5	-16.3	-16.3	-16.2	-16.2	-16.2	-16.2	
700	2	-30.6						-31.0	-20.2	-20.0	-20.0	-19.0	-19.0	-19.0	-19.0	

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.5

DATA SOURCE										MAY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	CUMULATIVE 2.280 5.000 15.900 50.000 84.100 95.000 97.720 99.000 99.865	MAX SPEED	DIR (DEG)							
5FC	744	-9.0		-8.9	-7.3	-6.1	-4.8	-3.3	-0.8	+0.8	+2.4	+3.7	+5.2	+7.9	+9.0
1.0	744	-15.0		-14.9	-11.8	-10.2	-7.6	-4.8	-0.5	+3.8	+7.5	+9.4	+10.9	+17.6	+18.0
2.0	744	-20.0		-17.9	-12.8	-10.8	-8.8	-5.0	-0.5	+4.6	+8.8	+12.0	+15.2	+18.9	+20.0
3.0	744	-21.0		-14.9	-12.8	-10.0	-7.5	-4.7	-0.4	+5.3	+11.3	+15.3	+17.8	+21.9	+26.0
4.0	744	-17.0		-16.9	-11.8	-9.6	-7.4	-4.5	-0.0	+6.1	+12.8	+17.6	+22.3	+25.4	+26.0
5.0	744	-15.0			-12.1	-9.0	-7.3	-4.1	+0.5	+8.2	+15.3	+17.8	+22.7	+26.9	+28.0
6.0	744	-15.0		-14.9	-11.3	-9.5	-7.6	-3.7	+1.0	+10.3	+16.4	+20.5	+25.5	+30.9	+34.0
7.0	744	-16.0		-15.9	-13.2	-9.8	-7.9	-3.6	+2.4	+12.0	+18.4	+23.6	+31.2	+36.9	+39.0
8.0	744	-21.0			-20.9	-14.3	-11.6	-8.4	+3.7	+14.4	+21.5	+26.7	+34.5	+39.9	+41.0
9.0	744	-23.0			-20.9	-15.9	-13.5	-9.4	+3.8	+16.6	+24.4	+29.0	+35.7	+43.9	+55.0
10.0	744	-25.0			-18.5	-15.5	-10.6	-3.8	+5.4	+19.1	+29.5	+37.5	+42.5	+49.9	+58.0
11.0	744	-31.0		-27.9	-21.1	-17.0	-11.7	-4.1	+7.2	+22.6	+34.9	+40.0	+45.5	+56.9	+58.0
12.0	744	-38.0		-31.9	-23.5	-17.5	-12.7	-4.2	+8.4	+25.4	+38.3	+45.4	+50.5	+66.9	+69.0
13.0	744	-35.0		-32.9	-23.5	-17.3	-12.6	-4.3	+8.8	+26.9	+38.6	+45.7	+49.5	+60.9	+72.0
14.0	744	-33.0		-25.9	-22.2	-16.0	-10.1	-3.0	+9.3	+23.9	+34.4	+40.2	+46.2	+58.9	+61.0
15.0	744	-23.0		-20.9	-18.5	-13.2	-9.5	-2.7	+7.4	+19.6	+28.2	+31.0	+33.5	+41.4	+42.0
16.0	744	-20.0		-19.9	-14.5	-11.0	-9.3	-3.4	+4.5	+15.0	+20.3	+22.8	+25.5	+28.9	+30.0
17.0	744	-16.0			-12.5	-11.1	-9.1	-4.7	+2.3	+9.6	+14.0	+17.2	+18.6	+21.4	+22.0
18.0	744	-13.0			-11.6	-10.6	-8.9	-5.4	-0.2	+5.3	+8.7	+10.8	+14.5	+18.9	+20.0
19.0	744	-13.0			-11.5	-10.1	-8.6	-5.6	-1.4	+2.2	+5.1	+7.4	+9.3	+12.9	+17.0
20.0	744	-20.0	-14.9		-10.8	-10.0	-8.9	-6.5	-2.8	+0.2	+3.2	+4.9	+6.2	+8.9	+10.0
21.0	744	-22.0	-13.9		-11.1	-10.2	-8.9	-7.1	-3.6	-0.5	+1.4	+2.7	+4.7	+8.9	+10.0
22.0	744	-13.0	-12.9		-11.3	-10.6	-9.8	-7.9	-4.6	-1.0	+0.4	+2.0	+4.2	+10.9	+12.0
23.0	744	-14.0			-12.6	-12.0	-10.6	-8.3	-4.8	-1.4	-0.0	+1.4	+2.6	+8.9	+14.0
24.0	744	-17.0	-16.9		-14.5	-12.9	-11.7	-8.7	-5.2	-1.4	+0.3	+2.1	+3.5	+5.9	+11.0
25.0	744	-16.0	-17.9		-15.3	-13.5	-12.1	-9.4	-5.5	-1.1	+0.4	+2.6	+4.1	+5.9	+7.0
26.0	744	-21.0	-20.9		-16.2	-14.7	-12.5	-9.6	-5.5	-0.9	+0.9	+3.1	+4.0	+5.9	+7.0
27.0	744	-19.0	-18.9		-16.8	-15.5	-13.6	-9.6	-5.2	-0.7	+1.4	+2.7	+3.9	+7.9	+9.0
28.0	103	-10.4			-16.0	-15.4	-13.9	-9.4	-5.1	-0.4	+1.0	+4.0	+5.0	+7.0	+10.4
29.0	105	-17.5			-16.0	-15.4	-14.6	-9.4	-4.4	-1.3	+6.2	+6.7	+7.0	+7.7	+7.4
30.0	105	-17.7			-17.7	-15.4	-13.0	-10.4	-4.6	-1.7	+7.0	+9.4	+11.0	+12.6	+16.1
31.0	107	-16.7			-16.7	-16.1	-13.0	-10.4	-4.4	-1.0	+4.0	+4.3	+11.4	+12.0	+12.7
32.0	110	-14.7			-18.4	-16.7	-13.5	-9.2	-1.0	+5.2	+6.0	+10.0	+11.0	+11.0	+12.0
33.0	112	-14.3			-17.0	-17.2	-14.3	-9.4	-3.3	-0.7	+4.4	+4.4	+4.4	+12.0	+17.1
34.0	113	-24.0			-19.0	-18.4	-13.3	-10.4	-2.0	+3.7	+10.2	+11.7	+12.0	+14.7	+14.8
35.0	113	-14.8			-14.8	-18.4	-16.4	-11.0	-4.4	+3.0	+9.7	+12.0	+14.0	+15.4	+15.6
36.0	113	-16.8				-15.7	-14.4	-11.4	-4.2	+4.0	+10.1	+11.0	+11.0	+17.6	+17.7
37.0	114	-26.9		-14.0		-16.4	-14.6	-11.0	-4.7	+1.7	+9.4	+14.1	+14.1	+14.0	+15.0
38.0	112	-17.9		-16.0		-16.2	-14.4	-10.2	-5.4	+2.1	+7.2	+11.4	+13.0	+15.4	+15.7
39.0	112	-17.6		-16.0		-15.2	-15.3	-12.1	-6.4	+1.3	+4.4	+8.9	+16.0	+22.7	+22.8
40.0	115	-20.0				-18.4	-15.4	-12.0	-7.8	-0.4	+3.3	+8.2	+8.2	+19.4	+19.9
41.0	116	-24.3		-21.4		-19.4	-14.6	-13.0	-4.7	-2.4	+4.2	+7.7	+8.4	+14.4	+14.9
42.0	116	-19.1		-18.1		-18.7	-17.4	-14.4	-9.5	-2.6	+4.2	+13.4	+15.4	+20.7	+20.9
43.0	113	-19.9		-19.4		-19.5	-17.7	-15.4	-10.2	-1.7	+6.2	+13.0	+21.0	+28.7	+28.4
44.0	112	-26.3		-24.0		-22.7	-20.7	-16.4	-4.7	-1.2	+3.2	+6.4	+11.0	+13.2	+13.4
45.0	111	-24.5		-23.0		-23.2	-20.2	-14.2	-9.1	-1.7	+3.5	+6.7	+11.0	+13.2	+13.4
46.0	104	-30.7		-26.0		-24.4	-22.4	-16.4	-4.0	-0.7	+4.5	+7.4	+9.0	+14.0	+14.1
47.0	107	-34.3		-29.0		-26.4	-22.4	-16.4	-4.0	-0.7	+6.2	+7.4	+8.0	+9.4	+9.4
48.0	106	-34.7		-29.0		-27.4	-23.4	-17.4	-9.5	-1.4	+3.4	+8.4	+9.0	+10.5	+10.6
49.0	104	-34.1		-35.0		-27.4	-25.4	-18.7	-11.0	-2.4	+2.4	+5.4	+6.0	+13.8	+13.9
50.0	100	-34.5		-40.0		-26.0	-26.0	-18.7	-10.6	-2.7	+4.0	+5.4	+6.0	+8.1	+8.2
51.0	94	-37.7				-30.4	-26.1	-21.1	-9.4	-3.1	+5.0	+5.0	+5.4	+6.6	+6.6
52.0	95	-37.1				-33.4	-28.2	-22.0	-10.4	-1.4	+5.1	+7.4	+10.0	+10.5	+10.5
53.0	90	-39.0				-39.0	-29.5	-21.0	-10.0	-1.6	+4.5	+7.0	+10.1	+11.2	+11.3
54.0	85	-41.5				-37.1	-27.4	-19.5	-11.5	-0.4	+5.4	+7.1	+20.2	+21.4	+21.5
55.0	74	-54.7				-44.4	-28.4	-18.4	-11.4	-0.4	+6.7	+5.7	+11.4	+12.1	+12.2
56.0	64	-51.4				-41.5	-30.3	-22.5	-11.5	-2.5	+5.7	+12.4	+17.2	+17.6	+17.7
57.0	57	-42.8				-39.7	-36.1	-23.4	-11.4	-0.4	+10.2	+11.7	+16.4	+16.6	+16.6
58.0	43	-43.9				-36.4	-27.2	-19.2	-1.4	+13.0	+24.0	+24.7	+25.1	+25.2	
59.0	33	-34.2				-25.4	-17.7	-9.4	+4.4	+16.2	+16.7	+16.9	+17.0		
60.0	20	-34.5				-34.0	-25.4	-11.0	+4.4	+24.0	+24.6	+24.8	+24.9	+24.9	
61.0	12	-41.9				-29.5	-16.0	-12.1	+18.4	+18.0	+19.1	+19.2	+19.2		
62.0	9	-44.6				-30.4	-14.5	-10.2	-4.7	+4.4	+4.4	+4.4	+4.4	+4.4	
63.0	2	-20.5				-29.0	-20.5	-10.2	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	
64.0	2	-30.5				-31.0	-27.5	-11.0	-27.5	-27.5	-27.5	-27.5	-27.5	-27.5	
65.0	2	-40.5				-41.0	-28.4	-11.0	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	
66.0	1	-45.8													
67.0	1	-27.0													
68.0	1	-29.6													
69.0	1	-24.7													
70.0	1	-19.1													

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.6

DATA SOURCE											JUNE					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
5.0	720	-7.0			-6.1	-4.9	-4.3	-2.4	-0.5	+1.2	+3.0	+3.9	+4.9	+10.0	+11.0	
1.0	720	-15.0			-9.2	-7.7	-6.0	-3.3	+0.3	+4.9	+8.3	+10.9	+12.9	+21.0	+22.0	
2.0	720	-9.0			-8.3	-6.9	-5.7	-2.8	+0.4	+5.1	+8.8	+11.1	+15.4	+21.6	+22.0	
3.0	720	-10.0			-7.2	-6.3	-5.2	-2.6	+0.8	+5.2	+8.5	+11.5	+14.9	+23.0	+24.0	
4.0	720	-9.0			-7.3	-6.3	-5.1	-2.4	+1.0	+5.3	+8.8	+12.9	+17.2	+31.0	+32.0	
5.0	720	-12.0			-8.1	-6.7	-5.1	-2.5	+0.8	+5.5	+9.0	+12.5	+16.4	+24.0	+25.0	
6.0	720	-16.0			-8.3	-7.2	-6.0	-3.1	+0.5	+5.9	+10.4	+13.1	+18.2	+25.0	+26.0	
7.0	720	-14.0			-10.3	-8.8	-6.9	-3.6	+1.2	+7.0	+11.5	+15.1	+18.6	+26.0	+27.0	
8.0	720	-12.0			-10.8	-9.8	-8.3	-4.7	+1.3	+8.2	+12.7	+17.2	+19.9	+25.5	+26.0	
9.0	720	-17.0			-13.6	-11.9	-9.7	-5.3	+1.8	+10.2	+14.8	+20.6	+24.2	+28.0	+29.0	
10.0	720	-24.0			-16.6	-14.5	-11.5	-6.3	+2.1	+11.5	+18.6	+25.5	+29.8	+34.0	+35.0	
11.0	720	-32.0			-19.5	-17.2	-13.7	-7.7	+2.2	+12.6	+22.0	+27.8	+31.9	+46.0	+47.0	
12.0	720	-32.0			-24.3	-20.8	-16.6	-9.2	+1.9	+14.8	+24.6	+32.2	+37.9	+52.0	+53.0	
13.0	720	-30.0			-25.3	-23.1	-18.0	-9.9	+2.4	+14.6	+27.0	+32.8	+41.8	+55.0	+56.0	
14.0	720	-31.0			-23.5	-21.5	-17.6	-10.2	+0.8	+10.9	+24.0	+30.6	+34.4	+44.0	+45.0	
15.0	720	-31.0			-21.2	-18.4	-15.0	-9.7	-0.7	+6.9	+15.1	+21.3	+25.4	+33.0	+34.0	
16.0	720	-21.0			-17.2	-15.5	-12.6	-8.8	-2.0	+3.1	+8.4	+13.5	+16.8	+19.0	+20.0	
17.0	720	-23.0			-14.6	-13.2	-10.8	-7.9	-3.1	+0.7	+3.9	+6.7	+8.9	+12.0	+13.0	
18.0	720	-21.0			-13.5	-12.5	-10.8	-8.3	-4.6	-0.8	+1.4	+2.8	+4.1	+4.8	+5.0	
19.0	720	-24.0			-13.7	-12.7	-11.3	-9.1	-5.5	-2.1	-0.3	+0.3	+1.9	+4.0	+5.0	
20.0	720	-20.0			-15.7	-13.8	-12.6	-10.2	-6.6	-3.1	-1.2	-0.4	-0.1	+3.0	+4.0	
21.0	720	-22.0			-15.3	-13.7	-12.5	-10.6	-7.4	-4.6	-2.4	-1.1	-0.2	+1.0	+2.0	
22.0	720	-21.0			-16.2	-14.8	-13.5	-11.5	-8.4	-5.0	-3.2	-2.2	-0.8	+0.5	+1.0	
23.0	720	-21.0			-17.3	-16.2	-14.7	-12.4	-9.1	-5.7	-3.8	-2.5	-1.5	+0.0	+1.0	
24.0	720	-20.0			-17.4	-16.3	-15.1	-13.2	-9.5	-6.2	-4.0	-2.7	-1.6	+0.0	+1.0	
25.0	720	-20.0			-19.2	-17.9	-16.3	-13.8	-10.3	-6.6	-4.2	-3.0	-2.1	+0.0	+1.0	
26.0	720	-21.0			-19.7	-18.6	-17.0	-14.3	-10.5	-6.7	-4.2	-3.0	-1.8	+1.0	+2.0	
27.0	720	-25.0			-20.4	-19.2	-17.7	-15.0	-10.8	-6.6	-4.1	-3.0	-1.8	+0.0	+1.0	
28.0	103	-21.9			-21.0	-19.8	-17.7	-14.5	-11.2	-6.2	-3.5	-2.5	-1.0	+0.0	+1.0	
29.0	104	-23.3			-21.0	-19.6	-17.4	-13.0	-11.3	-6.4	-3.6	-3.1	-1.0	+1.2	+1.4	
30.0	107	-22.9			-21.0	-20.3	-18.2	-14.1	-11.0	-5.7	-3.5	-1.7	-1.0	+1.2	+1.4	
31.0	104	-22.5			-21.0	-20.8	-17.9	-15.3	-10.7	-5.0	-3.3	-2.7	-2.0	+0.6	+0.7	
32.0	104	-24.0			-22.0	-21.0	-20.4	-16.6	-10.0	-4.0	-2.6	-0.2	-0.0	+1.3	+1.4	
33.0	104	-21.3				-20.5	-16.6	-10.0	-5.2	-2.2	-0.5	-0.0	-0.0	+2.9	+3.1	
34.0	110	-26.4			-24.0	-21.5	-18.0	-14.6	-11.5	-5.4	-1.2	-0.7	-1.0	+3.5	+3.5	
35.0	111	-31.9			-24.0	-27.5	-22.4	-17.5	-12.2	-6.0	-3.2	-1.5	-1.0	+0.1	+0.0	
36.0	111	-25.5			-24.0	-23.5	-22.0	-19.5	-14.8	-8.3	-5.3	-1.2	-0.6	+0.1	+0.0	
37.0	110	-27.8			-27.8	-25.7	-22.5	-19.4	-15.2	-9.2	-6.1	-2.5	-0.0	+2.0	+2.1	
38.0	110	-30.2			-24.0	-27.5	-24.2	-20.8	-15.0	-8.4	-6.2	-0.0	-0.3	+3.0	+3.0	
39.0	110	-29.7			-29.4	-28.5	-26.5	-22.8	-16.5	-10.3	-7.2	-4.5	-3.1	+1.5	+1.4	
40.0	110	-36.2			-34.0	-31.7	-27.5	-23.7	-18.2	-11.5	-8.6	-7.5	-6.5	+6.2	+6.1	
41.0	110	-34.1			-40.0	-34.5	-30.5	-27.3	-19.3	-13.5	-9.4	-8.0	-8.1	+7.7	+7.5	
42.0	109	-35.5			-34.0	-33.3	-32.2	-27.3	-20.5	-15.7	-12.1	-10.5	-9.1	+7.5	+7.5	
43.0	109	-33.9				-33.8	-31.5	-28.5	-21.3	-16.3	-13.4	-12.5	-11.5	+11.1	+11.0	
44.0	109	-39.8			-33.0	-32.0	-30.6	-28.6	-22.7	-16.4	-14.1	-10.7	-10.0	+5.0	+4.8	
45.0	109	-34.4			-36.0	-35.5	-33.3	-28.6	-23.3	-16.7	-13.4	-10.5	-8.1	+6.8	+6.6	
46.0	104	-45.1			-37.0	-36.5	-33.2	-29.0	-23.5	-16.5	-13.4	-10.5	-10.1	+9.7	+9.6	
47.0	107	-42.4				-38.6	-33.6	-29.4	-23.8	-17.0	-13.7	-10.7	-9.0	+7.4	+7.0	
48.0	101	-42.4			-42.0	-39.0	-36.9	-30.5	-23.6	-16.5	-12.0	-10.1	-7.0	+6.5	+6.5	
49.0	100	-50.9			-60.0	-39.7	-37.5	-31.4	-23.6	-15.4	-11.4	-10.2	-10.0	+9.1	+9.0	
50.0	92	-44.2				-40.6	-38.7	-32.2	-21.5	-14.0	-11.2	-9.5	-6.0	+5.0	+5.4	
51.0	89	-52.6				-42.5	-39.6	-32.0	-22.5	-13.8	-8.8	-8.0	-5.0	+5.5	+5.5	
52.0	80	-46.6				-45.2	-38.0	-31.2	-24.2	-15.8	-10.5	-8.0	-5.8	+5.2	+5.1	
53.0	75	-46.7				-42.3	-41.1	-36.1	-24.6	-15.8	-14.3	-13.7	-8.8	+8.2	+8.1	
54.0	73	-47.9				-44.3	-41.4	-35.0	-26.2	-19.5	-14.5	-13.7	-9.7	+8.4	+8.7	
55.0	70	-52.6				-44.4	-41.8	-38.0	-26.7	-17.7	-15.2	-14.8	-8.3	+8.0	+7.9	
56.0	66	-53.4				-47.5	-44.3	-38.3	-27.2	-20.7	-15.3	-14.5	-5.8	+8.5	+8.4	
57.0	62	-54.3				-45.8	-41.9	-37.2	-28.5	-19.8	-13.0	-1.3	-1.0	+2.1	+2.1	
58.0	52	-55.1				-40.9	-45.7	-40.7	-28.0	-18.3	-5.6	-0.9	-32.3	+32.5	+32.5	
59.0	40	-53.9				-49.0	-43.6	-28.3	-14.7	-12.0	-2.0	-2.5	-2.2	+2.2	+2.1	
60.0	31	-52.2					-49.1	-30.5	-20.3	-8.5	-22.2	-22.4	-22.6	+22.6	+22.6	
61.0	23	-52.1					-49.0	-49.1	-34.5	-13.5	-6.1	-5.4	-5.5	+5.5	+5.7	
62.0	14	-50.0						-48.0	-13.2	-1.7	-1.1	-1.2	-1.1	+1.0	+1.0	
63.0	6	-42.7						-48.0	-3.0	-3.1	-2.0	-2.8	-2.7	+2.7	+2.7	
64.0	2	-59.2						-50.0	-30.3	-39.1	-39.1	-39.0	-39.0	+39.0	+39.0	
65.0	2	-52.9						-51.0	-45.4	-45.0	-45.0	-45.0	-45.0	+45.0	+45.0	
66.0	1	-54.0												+54.0	+54.0	
67.0	1	-56.3												+56.3	+56.3	
68.0	1	-57.6												+57.6	+57.6	

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.7

DATA SOURCE											JULY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.000	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
5 FC	744	-6.0		-5.9	-4.2	-3.3	-2.6	-1.3	-0.2	+1.5	+2.7	+3.3	+3.8	+6.4	+7.0	
1.0	744	-11.0		-9.9	-7.0	-4.8	-3.5	-0.9	+1.5	+4.9	+7.8	+10.3	+12.1	+72.9	+27.0	
2.0	744	-13.0		-10.9	-6.1	-5.0	-4.1	-1.5	+1.0	+5.0	+8.2	+10.5	+11.9	+19.9	+24.0	
3.0	744	-10.0		-9.9	-6.7	-5.0	-4.0	-1.7	+0.9	+5.1	+8.6	+10.3	+12.8	+17.9	+20.0	
4.0	744	-9.0			-7.5	-5.7	-4.2	-2.1	+0.7	+5.5	+8.7	+10.1	+11.3	+17.9	+21.0	
5.0	744	-10.0			-7.5	-6.5	-4.9	-2.5	+0.3	+4.8	+7.7	+9.4	+11.5	+15.9	+17.0	
6.0	744	-12.0			-9.5	-7.3	-5.5	-3.0	+0.0	+4.4	+7.5	+9.1	+10.5	+14.9	+22.0	
7.0	744	-19.0		-16.9	-10.3	-9.0	-6.9	-4.1	-0.3	+3.9	+7.3	+8.7	+10.1	+12.7	+13.0	
8.0	744	-24.0		-18.9	-13.1	-10.3	-8.6	-5.1	-0.6	+3.9	+7.9	+9.6	+12.5	+15.9	+20.0	
9.0	744	-28.0		-21.9	-16.5	-13.8	-10.7	-6.7	-1.3	+4.1	+8.8	+12.5	+15.1	+18.9	+25.0	
10.0	744	-30.0		-26.9	-22.5	-15.5	-12.6	-8.6	-2.1	+4.3	+10.3	+14.8	+18.1	+22.9	+27.0	
11.0	744	-31.0		-30.9	-23.5	-18.3	-15.4	-10.5	-3.1	+4.8	+11.2	+16.8	+19.8	+22.9	+28.0	
12.0	744	-33.0		-32.9	-26.7	-22.8	-18.9	-12.5	-4.4	+4.6	+12.2	+17.2	+19.5	+23.9	+25.0	
13.0	744	-37.0		-34.9	-29.2	-26.0	-20.4	-14.3	-5.9	+3.5	+10.5	+18.0	+19.2	+23.9	+28.0	
14.0	744	-37.0		-34.9	-25.8	-21.9	-19.6	-13.8	-7.2	+1.5	+7.8	+12.0	+18.2	+23.9	+27.0	
15.0	744	-30.0		-28.9	-23.1	-20.0	-16.4	-12.2	-6.8	-0.4	+4.3	+7.0	+11.6	+13.9	+24.0	
16.0	744	-21.0		-20.9	-17.8	-15.0	-13.9	-10.6	-5.9	-0.9	+1.9	+4.2	+5.1	+8.9	+12.0	
17.0	744	-17.0		-14.7	-13.3	-11.6	-9.6	-5.9	-2.2	-0.1	+1.7	+2.8	+7.9	+9.0		
18.0	744	-15.0		-13.9	-11.5	-11.5	-9.6	-6.7	-3.6	-1.8	-0.7	+0.2	+0.6	+1.0		
19.0	744	-22.0		-17.9	-15.1	-14.4	-13.1	-11.0	-8.0	-5.2	-3.2	-2.0	-1.0	-0.0	+1.0	
20.0	744	-18.0		-17.9	-16.3	-16.2	-15.0	-12.9	-9.6	-6.6	-4.6	-3.4	-2.3	-0.0	+1.0	
21.0	744	-19.0			-18.3	-17.0	-15.8	-13.8	-10.7	-8.1	-6.4	-5.4	-4.6	-3.0	+3.0	
22.0	744	-24.0		-22.9	-19.1	-18.2	-16.8	-14.6	-11.7	-9.0	-7.2	-6.1	-5.1	-0.0	+3.0	
23.0	744	-24.0		-23.9	-19.9	-18.8	-17.8	-15.8	-12.6	-9.3	-7.6	-6.2	-4.8	-0.0	+3.0	
24.0	744	-26.0		-22.9	-20.3	-19.4	-18.3	-16.6	-13.3	-10.2	-8.1	-7.1	-6.2	-3.0	+1.0	
25.0	744	-25.0		-23.9	-22.5	-21.5	-19.8	-17.5	-14.1	-10.5	-8.6	-7.8	-6.7	-3.0	+1.0	
26.0	744	-24.0			-22.7	-21.7	-20.4	-18.2	-14.6	-11.0	-8.6	-7.5	-6.4	-2.0	+9.0	
27.0	744	-27.0			-24.1	-23.0	-21.7	-19.2	-14.7	-10.7	-8.3	-7.1	-5.8	-4.0	+3.0	
28.0	105	-25.3			-24.0	-23.5	-22.0	-20.5	-16.2	-11.0	-10.2	-9.2	-7.0	-3.7	+3.5	
29.0	104	-22.5				-24.0	-23.4	-20.5	-16.1	-12.2	-9.5	-6.7	-6.0	-4.5	+4.0	
30.0	111	-25.5			-24.0	-24.2	-23.4	-19.6	-15.2	-11.4	-8.8	-6.8	-6.1	-7.2	+7.1	
31.0	112	-25.5				-24.0	-24.3	-19.9	-15.7	-11.5	-9.5	-7.8	-7.1	-8.4	+4.5	
32.0	113	-26.9			-24.0	-24.2	-23.3	-20.5	-15.4	-11.5	-8.4	-8.4	-8.0	-5.9	+5.7	
33.0	117	-25.7			-25.4	-25.2	-22.5	-20.4	-15.7	-12.1	-9.0	-8.4	+5.2	+3.9	+3.7	
34.0	121	-31.9			-26.8	-25.8	-25.0	-21.4	-16.0	-12.0	-10.4	-9.0	-6.2	-5.0	+4.4	
35.0	122	-30.0				-29.2	-27.4	-25.2	-18.1	-13.4	-11.0	-9.0	-8.2	-2.1	+1.9	
36.0	122	-29.8				-29.8	-28.2	-25.7	-18.7	-15.1	-11.0	-8.0	-8.1	-1.5	+1.4	
37.0	122	-33.0				-31.8	-30.6	-29.5	-21.2	-15.4	-12.4	-9.0	-8.1	+6.4	+6.4	
38.0	124	-37.3				-34.8	-33.2	-30.4	-27.2	-21.9	-16.3	-12.1	-8.8	+7.2	+24.9	
39.0	125	-34.6				-35.0	-33.5	-32.7	-27.2	-22.3	-16.0	-13.0	-9.0	+5.3	+1.1	
40.0	125	-36.9				-36.7	-35.4	-34.2	-30.2	-24.8	-19.4	-15.1	-12.6	-10.2	+6.2	
41.0	125	-39.2				-37.7	-36.2	-34.9	-31.1	-25.1	-19.0	-17.2	-16.4	-7.9	+7.7	
42.0	124	-38.1					-37.4	-36.8	-32.4	-26.0	-22.2	-16.7	-15.8	-14.2	+8.4	
43.0	124	-41.1					-40.4	-37.8	-34.2	-30.2	-24.3	-18.6	-15.0	-13.2	+10.1	
44.0	122	-44.1					-42.7	-40.4	-36.6	-31.2	-23.2	-19.0	-16.4	-15.2	+13.3	
45.0	121	-45.1					-44.2	-40.5	-37.4	-30.5	-22.0	-19.7	-18.2	+16.4	+16.3	
46.0	119	-47.8				-46.8	-44.3	-41.5	-34.0	-30.4	-23.4	-18.3	-18.7	+10.7	+10.5	
47.0	118	-45.5				-48.1	-45.7	-42.4	-34.3	-30.5	-23.4	-17.9	-15.7	+14.5	+13.4	
48.0	117	-45.3				-48.4	-42.8	-38.0	-30.4	-23.4	-18.3	-15.7	+18.2	+8.1	+7.2	
49.0	115	-47.7				-47.5	-43.2	-38.0	-30.5	-23.1	-19.2	-17.4	+15.1	+12.5	+12.5	
50.0	113	-47.4				-46.7	-43.2	-38.7	-31.7	-21.6	-16.6	-12.0	-12.1	+7.2	+7.1	
51.0	110	-46.0				-45.2	-43.6	-38.0	-31.9	-23.4	-18.4	-13.1	-12.5	+12.1	+12.0	
52.0	108	-54.8				-46.9	-46.4	-44.6	-40.8	-31.2	-20.1	-13.8	-12.5	+18.1	+18.1	
53.0	103	-50.8				-50.0	-48.7	-46.4	-41.5	-31.2	-20.1	-15.0	-14.1	+8.0	+6.5	
54.0	97	-48.1				-47.0	-46.1	-41.0	-32.1	-21.7	-13.0	-13.1	+5.0	+4.1	+3.9	
55.0	89	-48.8				-46.0	-45.2	-40.4	-32.3	-20.1	-11.4	-8.0	+1.8	+1.4	+1.4	
56.0	84	-40.2					-44.6	-40.8	-37.1	-31.5	-20.2	-10.1	2.1	3.2	+4.1	
57.0	77	-53.8					-50.2	-47.1	-42.4	-32.1	-20.4	-7.8	+3.0	+8.2	+4.9	
58.0	66	-55.1					-51.5	-49.8	-45.4	-31.2	-21.2	-12.3	-4.4	-3.4	+2.4	
59.0	56	-67.8					-52.7	-48.7	-41.1	-30.5	-18.4	-8.4	-5.4	+3.6	+3.0	
60.0	41	-67.4					-47.9	-45.2	-32.5	-13.0	-9.0	-8.0	-7.6	+7.3	+7.3	
61.0	25	-64.3						-55.0	-35.2	-15.0	-7.2	-1.7	+1.5	+1.3	+1.3	
62.0	18	-60.7						-66.1	-38.0	-11.0	1.1	1.7	2.0	+2.2	+2.2	
63.0	11	-75.9						-73.4	-28.5	-0.7	1.3	1.0	1.6	1.6	1.6	
64.0	9	-70.2						-72.6	-28.5	-0.4	-0.4	-0.2	-0.1	0.0	0.0	
65.0	5	-54.8						-41.6	-31.5	-2.9	-2.6	-2.8	-2.3	-2.3	-2.3	
66.0	4	-105.2							-26.0	7.4	7.7	7.0	7.4	7.0	7.0	
67.0	5	-60.1							-25.5	-7.4	-7.1	-7.0	-6.9	-6.4	-6.4	
68.0	5	-25.5								-15.8	-15.2	-15.1	-14.0	-14.9	-14.9	
69.0	5	-46.0									1.2	1.6	1.7	1.4	1.4	
Positive is wind from the tail (225°). Negative is wind from the head (45°).																

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.8

DATA SOURCE											AUGUST					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OSS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5F	744	-8.0	-5.9	-4.6	-3.8	-3.1	-2.0	-0.5	-1.0	-2.6	-3.5	-4.3	-7.9	-7.9	11.0	
1.0	744	-11.0	-8.5	-6.3	-4.8	-2.3	-0.2	-0.2	-0.3	-7.0	-9.0	-10.6	-17.9	-17.9	25.0	
2.0	744	-12.0	-10.9	-8.3	-6.7	-4.9	-2.6	-0.0	-0.7	-7.3	-9.0	-11.3	-15.9	-15.9	25.0	
3.0	744	-11.0	-10.9	-7.6	-6.4	-5.3	-2.9	-0.1	-0.8	-8.0	-9.7	-11.7	-16.9	-16.9	22.0	
4.0	744	-12.0	-9.9	-7.8	-7.0	-5.7	-2.8	-0.3	-0.8	-8.6	-10.6	-13.2	-16.9	-16.9	20.0	
5.0	744	-14.0	-12.9	-8.9	-7.5	-5.9	-3.1	-0.1	-5.0	-9.4	-12.2	-13.9	-17.9	-17.9	19.0	
6.0	744	-16.0	-18.9	-10.6	-8.5	-6.9	-3.8	-0.1	-0.8	-8.8	-11.7	-16.1	-20.9	-20.9	22.0	
7.0	744	-20.0	-16.9	-11.5	-9.5	-7.6	-4.4	-0.4	-0.6	-8.8	-11.3	-15.8	-20.6	-20.6	21.0	
8.0	744	-20.0	-18.9	-12.2	-10.7	-9.3	-5.5	-0.6	-0.2	-8.9	-11.6	-14.5	-19.4	-19.4	20.0	
9.0	744	-25.0	-19.9	-15.2	-12.9	-10.5	-6.7	-0.7	-0.5	-8.9	-12.5	-15.5	-19.9	-19.9	30.0	
10.0	744	-31.0	-28.9	-20.1	-17.0	-13.1	-8.3	-0.8	-0.8	-9.9	-14.8	-17.6	-22.9	-22.9	49.0	
11.0	744	-38.0	-34.9	-23.1	-20.0	-14.9	-10.1	-1.2	-0.6	-12.1	-16.4	-18.5	-26.9	-26.9	45.0	
12.0	744	-42.0	-40.9	-25.5	-21.0	-17.7	-11.8	-1.6	-0.8	-13.4	-16.8	-20.5	-28.9	-28.9	39.0	
13.0	744	-43.0	-40.9	-27.2	-23.3	-18.6	-12.6	-2.8	-0.6	-12.8	-16.0	-21.5	-26.9	-26.9	35.0	
14.0	744	-35.0	-33.9	-26.5	-23.0	-17.1	-12.1	-3.8	-0.7	-10.2	-14.2	-16.8	-21.9	-21.9	26.0	
15.0	744	-28.0	-23.9	-18.7	-16.5	-13.4	-9.8	-3.6	-1.8	-7.0	-8.9	-11.5	-13.9	-13.9	15.0	
16.0	744	-20.0	-19.9	-14.9	-13.8	-11.6	-8.2	-3.7	-0.0	-3.6	-4.8	-5.8	-7.9	-7.9	9.0	
17.0	744	-20.0	-14.9	-13.1	-12.1	-10.9	-8.2	-4.7	-0.9	-0.6	-1.7	-3.3	-5.4	-5.4	6.0	
18.0	744	-16.0	-15.9	-12.9	-12.9	-11.1	-9.0	-5.9	-2.9	-1.0	-0.2	-0.7	-2.9	-2.9	4.0	
19.0	744	-19.0	-16.9	-15.1	-13.8	-12.8	-10.8	-7.7	-0.6	-2.3	-1.3	-0.6	-0.9	-0.9	2.0	
20.0	744	-26.0	-19.9	-16.4	-15.6	-14.6	-12.5	-9.3	-6.4	-4.5	-3.4	-2.4	-0.3	-0.3	0.0	
21.0	744	-31.0	-21.9	-18.5	-16.9	-15.2	-13.5	-10.3	-7.9	-6.2	-5.3	-4.2	-2.5	-2.5	2.0	
22.0	744	-28.0	-21.9	-18.7	-17.6	-16.5	-14.6	-11.5	-8.9	-7.1	-6.1	-5.3	-3.5	-3.5	3.0	
23.0	744	-28.0	-24.9	-20.5	-18.9	-17.9	-15.6	-12.0	-9.2	-7.4	-6.3	-5.3	-3.0	-3.0	2.0	
24.0	744	-28.0	-27.9	-22.8	-19.9	-18.3	-16.3	-12.7	-9.6	-7.8	-6.8	-6.1	-4.0	-4.0	2.0	
25.0	744	-33.0	-25.9	-22.8	-20.7	-19.3	-16.9	-13.4	-10.6	-8.8	-7.8	-6.6	-5.0	-5.0	3.0	
26.0	744	-28.0	-26.9	-23.5	-22.0	-19.9	-17.8	-14.2	-10.8	-8.8	-7.9	-6.8	-5.0	-5.0	3.0	
27.0	744	-30.0	-29.9	-24.9	-23.0	-21.5	-18.6	-15.0	-11.3	-9.1	-8.1	-7.3	-6.0	-6.0	4.0	
28.0	110	-21.8		-20.8		-21.8	-19.8	-15.7	-11.4	-9.1	-8.2	-7.1	-5.1	-5.1	4.9	
29.0	113	-24.1		-23.0		-21.9	-19.2	-15.6	-11.8	-9.7	-8.8	-7.8	-6.8	-6.8	7.8	
30.0	113	-24.7		-24.7		-21.7	-19.6	-15.6	-12.4	-9.0	-8.0	-7.0	-6.0	-6.0	6.6	
31.0	115	-34.7		-24.8		-23.7	-22.6	-19.4	-15.6	-11.6	-8.8	-8.0	-7.2	-7.2	7.1	
32.0	115	-24.0		-25.8		-22.6	-19.0	-15.7	-11.1	-8.9	-8.0	-7.0	-6.0	-6.0	3.5	
33.0	115	-30.1		-24.0		-24.5	-22.2	-19.1	-15.2	-11.2	-8.2	-6.6	-4.8	-4.8	4.2	
34.0	117	-26.4		-24.8		-24.5	-23.0	-19.1	-15.2	-11.2	-8.2	-6.6	-4.8	-4.8	0.7	
35.0	114	-29.6				-25.6	-21.0	-16.5	-11.4	-8.5	-7.5	-6.2	-4.0	-4.0	0.0	
36.0	118	-31.9		-24.8		-27.7	-25.4	-22.3	-17.2	-11.6	-8.4	-7.2	-5.0	-5.0	17.3	
37.0	120	-30.9		-30.0		-26.5	-24.2	-21.0	-16.5	-11.0	-8.5	-7.0	-5.0	-5.0	12.1	
38.0	120	-32.6		-31.8		-30.3	-29.0	-23.6	-17.8	-12.2	-9.0	-7.7	-5.8	-5.8	5.5	
39.0	120	-32.0				-30.5	-23.7	-18.0	-12.1	-8.5	-7.2	-6.0	-4.8	-4.8	4.9	
40.0	119	-36.1		-32.0		-30.5	-25.5	-19.5	-12.6	-8.6	-7.7	-6.7	-5.0	-5.0	2.8	
41.0	117	-34.2				-31.1	-27.3	-21.5	-15.2	-9.8	-6.8	-6.1	-3.8	-3.8	3.3	
42.0	117	-37.5				-34.7	-32.6	-28.7	-22.2	-15.2	-9.8	-8.7	-6.0	-6.0	4.5	
43.0	117	-41.0		-40.8		-36.7	-35.8	-30.8	-23.6	-15.0	-9.9	-8.8	-6.1	-6.1	4.0	
44.0	115	-44.5				-49.6	-35.6	-32.2	-23.1	-12.6	-7.7	-5.4	-2.2	-2.2	1.2	
45.0	114	-49.7		-39.0		-36.8	-33.6	-32.0	-23.4	-14.0	-9.6	-6.8	-4.1	-4.1	1.5	
46.0	113	-48.5		-38.0		-37.4	-35.7	-32.0	-22.2	-12.7	-9.3	-8.2	-6.1	-6.1	4.8	
47.0	110	-53.7		-42.0		-42.2	-38.6	-30.7	-21.2	-13.6	-9.7	-7.6	-5.1	-5.1	3.6	
48.0	110	-46.2				-45.6	-39.7	-28.0	-20.7	-13.1	-7.5	-5.6	-4.1	-4.1	0.3	
49.0	104	-50.0				-47.6	-43.6	-31.4	-19.6	-11.6	-9.1	-5.6	-4.1	-4.1	2.5	
50.0	105	-51.7				-47.3	-41.7	-31.3	-20.8	-12.7	-8.6	-6.2	-4.0	-4.0	1.0	
51.0	105	-66.5				-49.0	-39.4	-32.1	-19.8	-10.2	-8.6	-5.4	-3.0	-3.0	9.2	
52.0	98	-74.8				-42.8	-30.1	-30.0	-19.2	-9.6	-5.1	-3.0	-1.0	-1.0	5.6	
53.0	96	-60.6				-50.8	-41.2	-32.0	-17.3	-8.1	-5.0	-3.0	-1.0	-1.0	5.7	
54.0	91	-63.0				-46.0	-42.5	-35.2	-19.2	-8.7	-5.0	-3.0	-1.0	-1.0	10.6	
55.0	83	-51.4				-46.1	-39.8	-29.8	-17.7	-8.1	-5.0	-3.0	-1.0	-1.0	13.3	
56.0	75	-56.2				-48.4	-43.2	-28.1	-14.5	-7.0	-4.1	-2.1	-1.0	-1.0	21.1	
57.0	61	-52.7				-47.6	-42.5	-28.1	-11.0	-2.1	-7.0	-16.4	-18.4	-18.4	18.9	
58.0	48	-45.5				-39.0	-38.6	-26.1	-10.0	-5.4	-14.6	-16.0	-18.4	-18.4	18.8	
59.0	37	-40.6					-33.1	-25.1	-4.2	-4.7	-25.2	-46.1	-46.6	-46.6	46.7	
60.0	27	-34.6						-26.7	-2.4	-13.7	-21.7	-25.4	-25.4	-25.4	26.2	
61.0	27	-35.1						-28.7	-4.5	-17.7	-20.2	-34.3	-34.3	-34.3	34.7	
62.0	19	-32.4						-30.5	-6.5	-18.0	-22.1	-22.4	-22.4	-22.4	23.1	
63.0	16	-42.8						-30.6	-8.0	-7.6	-28.2	-28.7	-29.0	-29.0	29.2	
64.0	10	-23.3						-18.4	-6.7	-3.4	-21.5	-21.7	-21.8	-21.8	21.9	
65.0	8	-34.8						-24.7	-10.0	-3.3	-15.3	-15.6	-15.6	-15.6	15.6	
66.0	7	-28.3						-20.2	-10.5	-5.1	-15.8	-16.1	-16.2	-16.2	16.3	
67.0	6	-36.9						-13.0	-2.0	-2.1	-1.0	-1.7	-1.7	-1.7	1.7	
68.0	5	-20.7						-13.5	-0.8	-0.1	-0.0	-0.1	-0.1	-0.1	0.1	
69.0	4	-18.0						-15.0	-1.3	-1.8	-1.0	-1.0	-1.0	-1.0	1.9	
70.0	4	-17.1						-16.0	-1.3	-1.8	-1.8	-1.8	-1.8	-1.8	18.8	

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.9

DATA SOURCE										SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED	DIR (DEG)
5FC 720	-17.0	-10.7	-7.9	-6.3	-4.1	-1.1	-0.2	-2.4	-3.9	-2.9	-11.5	-12.0	-11.5	-12.0		
1.0 720	-23.0	-14.7	-12.1	-10.0	-6.4	-1.4	-0.7	-3.1	-7.7	-12.7	-18.8	-29.0	-30.0	-34.0		
2.0 720	-21.0	-15.7	-11.3	-8.7	-5.4	-0.7	-0.4	-4.0	-9.3	-14.3	-19.6	-29.0	-30.0	-34.0		
3.0 720	-22.0	-13.7	-9.4	-7.7	-4.7	-0.5	-0.4	-4.9	-10.5	-14.6	-18.9	-29.0	-30.0	-34.0		
4.0 720	-22.0	-12.3	-9.1	-7.2	-4.3	-0.3	-0.3	-5.5	-11.6	-14.5	-18.8	-29.0	-30.0	-34.0		
5.0 720	-24.0	-12.8	-9.7	-7.5	-4.5	-0.3	-0.3	-6.0	-13.2	-15.9	-17.8	-31.0	-32.0	-32.0		
6.0 720	-29.0	-13.2	-10.4	-8.5	-5.1	-0.3	-0.3	-6.6	-11.7	-16.1	-18.7	-23.0	-24.0	-24.0		
7.0 720	-31.0	-15.8	-12.4	-9.2	-5.1	-0.1	-0.1	-7.1	-13.2	-17.1	-20.4	-25.0	-26.0	-26.0		
8.0 720	-30.0	-17.8	-14.8	-9.8	-5.8	-0.0	-0.0	-8.3	-15.6	-19.3	-22.3	-27.0	-28.0	-28.0		
9.0 720	-31.0	-16.3	-13.3	-10.6	-6.2	-0.7	-0.7	-9.7	-17.5	-21.6	-24.6	-29.0	-30.0	-30.0		
10.0 720	-29.0	-19.2	-15.3	-12.3	-7.1	-1.2	-1.2	-11.3	-19.5	-23.6	-26.6	-31.0	-32.0	-32.0		
11.0 720	-32.0	-22.3	-19.1	-13.7	-7.6	-1.7	-1.7	-13.0	-21.2	-25.7	-28.2	-35.0	-36.0	-36.0		
12.0 720	-29.0	-22.8	-19.7	-15.7	-8.7	-2.5	-2.5	-13.9	-22.0	-26.8	-27.9	-34.0	-37.0	-37.0		
13.0 720	-32.0	-23.5	-21.4	-17.5	-9.5	-2.0	-2.0	-14.0	-21.7	-27.0	-29.2	-36.0	-37.0	-37.0		
14.0 720	-30.0	-22.7	-21.1	-16.8	-10.0	-0.9	-0.9	-12.1	-19.2	-22.1	-23.9	-30.0	-31.0	-31.0		
15.0 720	-24.0	-20.9	-18.5	-14.7	-8.9	-0.2	-0.2	-8.5	-13.0	-15.5	-17.7	-21.0	-22.0	-22.0		
16.0 720	-24.0	-18.3	-14.9	-12.3	-8.0	-1.1	-1.1	-4.6	-8.5	-10.3	-12.9	-20.5	-21.0	-21.0		
17.0 720	-20.0	-15.1	-12.3	-10.2	-7.2	-2.0	-2.0	-1.8	-5.3	-6.7	-8.4	-13.0	-14.0	-14.0		
18.0 720	-21.0	-12.4	-11.4	-10.2	-7.4	-3.0	-3.0	-0.0	-2.8	-4.8	-6.5	-10.0	-11.0	-11.0		
19.0 720	-19.0	-12.7	-11.8	-10.6	-6.5	-4.7	-4.7	-1.0	-0.6	-2.0	-3.4	-7.0	-8.0	-8.0		
20.0 720	-19.0	-14.4	-12.9	-11.6	-9.5	-6.1	-6.1	-2.5	-0.6	-0.0	-2.1	-4.0	-5.0	-5.0		
21.0 720	-17.0	-14.9	-12.9	-12.2	-10.0	-7.0	-7.0	-3.8	-1.6	-0.4	-0.1	-1.0	-2.0	-2.0		
22.0 720	-16.0	-14.9	-13.8	-12.9	-11.1	-7.8	-7.8	-4.8	-2.8	-1.6	-0.7	-0.0	-0.0	-0.0		
23.0 720	-19.0	-16.4	-15.0	-13.8	-11.8	-8.4	-8.4	-5.3	-3.5	-2.4	-1.5	-0.0	-1.0	-1.0		
24.0 720	-20.0	-17.4	-16.2	-14.7	-12.2	-9.1	-9.1	-5.6	-3.7	-2.2	-0.5	-2.0	-3.0	-3.0		
25.0 720	-21.0	-18.1	-16.6	-15.5	-13.2	-9.5	-9.5	-6.1	-3.5	-1.7	-0.6	-2.0	-3.0	-3.0		
26.0 720	-23.0	-19.3	-17.9	-16.4	-13.7	-9.8	-9.8	-6.1	-3.4	-2.3	-0.8	-1.0	-2.0	-2.0		
27.0 720	-22.0	-19.5	-18.5	-16.8	-14.2	-9.9	-9.9	-6.0	-3.6	-2.0	-0.5	-1.0	-2.0	-2.0		
28.0 104	-21.2	-18.0	-17.4	-16.2	-14.0	-10.0	-10.0	-3.0	-1.2	-0.6	1.0	4.1	4.2	4.2		
29.0 107	-25.1	-19.0	-18.4	-16.4	-14.1	-8.7	-8.7	-4.2	-0.2	1.2	1.8	2.2	2.4	2.4		
30.0 104	-20.5	-18.0	-16.2	-16.1	-13.1	-8.7	-8.7	-3.2	-0.1	3.4	8.4	4.7	4.8	4.8		
31.0 104	-19.4	-18.0	-17.5	-15.4	-12.7	-7.9	-7.9	-3.9	-0.1	0.4	5.4	10.1	10.3	10.3		
32.0 104	-20.8	-18.0	-16.4	-14.6	-11.0	-7.0	-7.0	-3.1	0.4	5.4	8.9	10.1	10.3	10.3		
33.0 104	-16.1	-14.5	-12.2	-10.2	-6.9	-2.6	-2.6	2.4	5.4	5.4	7.0	11.5	11.4	11.4		
34.0 104	-16.9	-15.4	-14.5	-11.9	-7.1	-0.4	-0.4	5.1	5.0	5.0	6.0	8.9	9.1	9.1		
35.0 104	-24.3	-17.5	-15.4	-12.1	-6.1	-0.4	-0.4	5.3	5.0	5.0	6.0	8.6	8.7	8.7		
36.0 104	-21.9	-21.0	-17.5	-13.0	-12.2	-6.3	-6.3	0.1	3.3	4.4	5.0	7.2	7.4	7.4		
37.0 107	-21.5	-21.5	-18.4	-16.3	-12.7	-5.6	-5.6	-0.2	3.4	6.6	6.6	9.1	9.2	9.2		
38.0 106	-24.7	-20.0	-18.4	-14.3	-13.1	-7.2	-7.2	-0.3	4.6	5.0	7.0	9.5	9.6	9.6		
39.0 104	-22.5	-21.5	-18.6	-12.9	-7.8	-1.1	-1.1	3.7	8.6	9.9	11.1	11.2	11.2	11.2		
40.0 106	-20.4	-22.0	-19.4	-14.7	-7.7	1.0	1.0	4.3	6.0	6.6	6.6	7.2	7.2	7.2		
41.0 102	-24.0	-24.0	-23.3	-21.3	-18.4	-6.7	-6.7	0.5	4.0	10.4	11.0	14.0	14.1	14.1		
42.0 102	-26.9	-26.0	-24.7	-22.0	-16.7	-6.7	-6.7	0.5	4.0	5.7	8.9	13.6	13.7	13.7		
43.0 100	-29.9	-30.0	-24.7	-21.3	-14.4	-6.9	-6.9	1.7	7.0	7.0	10.0	12.1	12.3	12.3		
44.0 94	-32.2	-30.7	-28.1	-19.4	-6.3	1.6	1.6	7.0	7.7	10.0	10.0	10.9	11.0	11.0		
45.0 94	-33.5	-20.4	-18.6	-12.0	-6.0	2.6	2.6	6.3	4.4	13.0	13.7	13.8	13.8	13.8		
46.0 94	-29.3	-20.4	-19.1	-11.8	-4.5	3.9	3.9	9.3	11.0	13.1	14.2	14.3	14.3	14.3		
47.0 84	-22.6	-21.0	-17.7	-11.4	-2.7	5.3	5.3	10.7	14.0	16.1	16.0	17.0	17.0	17.0		
48.0 84	-21.9	-19.1	-14.9	-12.4	-2.5	5.4	5.4	10.4	12.1	15.2	16.1	16.3	16.3	16.3		
49.0 83	-22.6	-21.1	-17.8	-10.3	-1.0	6.9	6.9	11.4	13.1	15.1	15.1	15.7	15.4	15.4		
50.0 81	-21.9	-20.2	-12.9	-9.4	-0.0	9.6	9.6	15.5	10.9	23.2	23.9	24.0	24.0	24.0		
51.0 76	-19.6	-19.4	-18.6	-12.0	0.0	10.4	10.4	18.1	18.1	20.1	20.5	20.5	20.5	20.5		
52.0 64	-19.0	-18.7	-17.7	-10.5	1.0	10.4	10.4	15.4	19.4	20.2	20.5	20.5	20.5	20.5		
53.0 61	-19.6	-17.4	-15.0	-8.7	3.3	12.1	12.1	17.0	20.0	20.8	21.2	21.2	21.2	21.2		
54.0 54	-17.8	-14.8	-14.1	-4.9	6.0	13.4	13.4	19.1	22.7	32.5	33.1	33.2	33.2	33.2		
55.0 55	-16.2	-15.7	-13.2	-6.3	6.5	13.1	13.1	19.3	25.7	39.3	39.6	39.6	39.6	39.6		
56.0 46	-12.0	-12.0	-10.7	-6.7	5.0	15.2	15.2	20.7	24.0	27.6	28.0	28.0	28.0	28.0		
57.0 37	-7.9	-7.6	-4.1	-4.1	5.5	12.7	12.7	20.2	22.1	22.4	22.6	22.6	22.6	22.6		
58.0 31	-6.6	-6.4	-2.4	-2.4	0.4	12.1	12.1	24.7	24.0	25.0	25.4	25.5	25.5	25.5		
59.0 20	-4.9	-4.9	-0.0	-0.0	0.4	7.7	7.7	30.1	31.0	31.9	31.9	31.9	31.9	31.9		
60.0 12	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0		
61.0 4	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8		
62.0 4	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2		
63.0 6	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1	-20.1		
64.0 2	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5		
65.0 1	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4		
66.0 1	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7		
67.0 1	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5		
68.0 1	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4		
69.0 1	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7		
70.0 1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8		

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.10

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-14.0			-9.4	-8.2	-6.8	-4.4	-1.3	+0.3	+1.9	+3.2	+3.8	+6.9	+13.0	
10	744	-18.0		-16.9	-14.7	-13.1	-11.3	-8.0	-2.3	+3.0	+7.3	+9.6	+13.2	+15.7	+16.0	
20	744	-17.0			-14.3	-11.6	-9.3	-5.5	-0.4	+5.3	+9.3	+13.0	+15.8	+20.4	+21.0	
30	744	-16.0		-14.9	-12.6	-9.6	-7.7	-3.8	+0.6	+6.6	+11.9	+14.7	+17.5	+22.9	+24.0	
40	744	-15.0		-14.9	-9.7	-7.9	-6.5	-3.0	+2.0	+8.1	+12.5	+17.0	+21.7	+26.9	+28.0	
50	744	-19.0		-17.9	-10.8	-8.4	-6.4	-2.6	+3.3	+10.3	+14.8	+20.2	+25.5	+30.9	+33.0	
60	744	-19.0		-15.9	-11.1	-8.7	-7.0	-2.0	+9.5	+12.0	+17.6	+22.8	+27.1	+35.9	+35.0	
70	744	-16.0		-15.9	-12.5	-8.8	-6.8	-1.3	+5.8	+15.0	+21.5	+26.3	+29.7	+38.9	+56.0	
80	744	-19.0		-17.9	-13.5	-10.2	-6.4	-0.7	+7.3	+18.3	+24.7	+30.3	+35.5	+42.9	+59.0	
90	744	-19.0			-15.1	-11.0	-6.2	-0.8	+9.3	+20.9	+30.3	+36.0	+39.8	+47.9	+74.0	
100	744	-20.0			-16.7	-11.5	-7.1	-0.9	+11.3	+24.2	+35.3	+40.7	+45.5	+59.9	+72.0	
110	744	-22.0		-21.9	-16.5	-11.7	-7.4	-0.9	+12.5	+28.2	+38.5	+44.6	+47.2	+61.9	+67.0	
120	744	-24.0		-20.9	-16.5	-11.3	-7.8	-0.9	+13.9	+30.5	+40.2	+44.5	+48.8	+62.9	+65.0	
130	744	-25.0		-22.9	-15.8	-12.0	-7.8	-0.8	+13.9	+28.5	+37.8	+42.1	+44.8	+55.9	+60.0	
140	744	-21.0		-16.9	-14.5	-11.0	-7.6	-0.8	+11.7	+24.5	+32.4	+36.0	+39.5	+41.9	+47.0	
150	744	-17.0		-16.9	-11.1	-8.6	-5.8	-0.7	+9.9	+19.8	+25.6	+30.0	+33.5	+38.9	+41.0	
160	744	-17.0		-14.9	-10.2	-6.8	-4.5	-0.9	+6.5	+14.3	+20.2	+23.5	+26.7	+32.9	+34.0	
170	744	-19.0		-11.9	-7.7	-6.2	-4.6	-1.7	+3.0	+9.5	+14.8	+19.0	+23.5	+30.9	+32.0	
180	744	-9.0		-8.9	-8.0	-6.6	-5.5	-3.1	+0.1	+5.5	+10.1	+14.0	+17.7	+24.9	+38.0	
190	744	-11.0		-10.9	-8.8	-7.7	-6.4	-3.3	+0.8	+2.5	+6.4	+9.8	+11.9	+23.9	+25.0	
200	744	-11.0		-10.9	-8.8	-8.3	-7.3	-5.3	-1.7	+1.2	+4.9	+7.0	+8.8	+15.9	+23.0	
210	744	-14.0		-12.9	-9.7	-9.0	-8.1	-5.9	-2.4	+0.3	+3.0	+5.3	+8.0	+13.9	+16.0	
220	744	-12.0		-11.0	-9.6	-8.4	-6.3	-2.9	-0.1	+2.6	+4.4	+5.7	+7.9	+7.9	+11.0	
230	744	-16.0		-13.9	-12.3	-10.9	-9.1	-6.8	-3.1	-0.1	+2.6	+4.2	+5.7	+7.9	+9.0	
240	744	-12.0		-11.0	-10.3	-9.4	-7.0	-2.9	-0.0	+2.7	+5.1	+6.8	+8.9	+8.9	+11.0	
250	744	-13.0		-12.9	-11.4	-10.6	-9.5	-6.9	-2.9	+0.5	+3.5	+5.5	+7.7	+9.9	+11.0	
260	744	-14.0			-12.6	-11.6	-9.9	-7.1	-2.5	+1.7	+4.8	+6.2	+7.5	+8.9	+12.0	
270	744	-15.0			-13.1	-11.6	-10.0	-6.7	-2.0	+2.6	+6.2	+7.8	+9.5	+12.4	+13.0	
280	74	-11.0						-6.3	0.0	5.9	8.7	10.1	10.4	11.2	11.3	
290	82	-11.4				-11.1	-9.4	-6.0	0.5	7.3	10.6	11.6	12.1	12.7	12.7	
300	84	-7.8						-5.3	0.9	4.2	12.7	17.1	20.1	20.4	20.5	
310	85	-12.0				-11.1	-9.4	-4.3	2.6	10.2	14.4	19.6	20.2	21.1	21.2	
320	90	-13.4				-10.0	-8.0	-3.0	4.8	10.4	15.6	19.0	24.1	25.3	25.5	
330	90	-11.1				-8.0	-6.2	-2.1	6.0	12.5	19.4	24.0	29.1	30.2	30.4	
340	90	-9.2				-8.0	-6.2	-1.6	6.3	15.4	19.5	22.0	29.1	24.7	24.4	
350	90	-13.4				-10.0	-8.5	-3.2	6.3	17.7	22.3	24.0	33.1	34.0	34.2	
360	91	-16.3				-10.9	-8.5	-3.3	7.1	17.4	22.2	23.0	27.1	27.5	27.6	
370	90	-17.0				-14.0	-10.5	-3.9	6.0	17.9	23.5	25.7	27.1	24.2	24.4	
380	89	-17.7				-9.0	-6.7	-4.6	7.5	20.0	27.5	29.0	30.2	31.3	31.4	
390	94	-8.5				-7.0	-6.3	-1.0	9.8	26.5	32.2	33.0	36.7	37.3	37.4	
400	95	-9.2				-5.0	-4.3	0.5	12.6	27.9	35.3	34.8	41.1	42.2	42.4	
410	94	-6.4				-5.0	-4.1	2.5	12.8	29.1	34.3	40.0	44.0	44.4	44.5	
420	97	-9.2				-8.8	-8.7	4.1	13.4	29.5	41.2	43.8	44.0	49.0	49.1	
430	97	-9.9				-3.9	-2.1	4.7	15.5	31.3	42.2	49.0	50.0	50.4	50.4	
440	94	-12.0				-2.0	-1.4	3.0	17.6	34.5	42.3	51.0	55.0	55.5	55.5	
450	92	-11.3				-3.9	-0.7	4.2	20.3	36.4	44.4	53.0	56.1	57.2	57.4	
460	93	-16.3				-5.0	-0.2	7.4	22.1	30.2	47.4	52.0	59.1	59.4	60.0	
470	91	-12.0				-4.9	-0.7	6.8	25.4	39.4	48.7	54.0	62.1	53.0	63.1	
480	89	-1.4				0.0	3.2	10.6	29.4	43.9	51.0	55.0	69.1	69.4	69.7	
490	86	0.2				1.0	3.3	10.2	28.6	44.2	54.7	65.0	75.2	76.2	76.3	
500	84	-0.1				0.0	4.1	12.3	30.0	49.2	55.9	69.1	80.2	80.4	81.0	
510	79	-0.3				2.4	3.7	10.7	27.9	44.5	57.5	72.1	72.2	73.3	73.4	
520	75	-0.7				-0.3	3.0	12.0	30.5	51.1	62.3	75.4	83.1	83.5	83.6	
530	70	-0.7				3.6	4.9	13.5	32.7	51.9	63.3	64.4	74.3	74.0	75.0	
540	63	0.3				5.1	5.7	14.0	33.5	51.3	63.4	66.2	70.3	70.4	70.9	
550	57	0.7				2.3	8.4	14.0	31.3	46.0	64.2	67.7	74.3	74.6	74.6	
560	44	0.0				1.1	4.4	12.2	31.5	47.8	64.6	66.0	68.7	69.3	69.3	
570	40	0.0					3.0	11.7	32.5	45.7	62.0	70.1	70.4	70.7	70.7	
580	34	-4.9					-1.3	11.2	31.0	45.3	59.3	66.2	66.4	66.4	66.7	
590	27	-9.9					5.4	11.3	29.5	49.7	54.7	63.6	63.0	64.2	64.2	
600	22	-10.6					-1.9	15.2	28.5	45.4	54.0	59.3	59.4	69.5	69.5	
610	14	10.3						20.2	33.0	47.4	74.3	74.4	74.7	74.8	74.9	
620	4	24.5							25.0	52.3	52.7	52.8	52.9	52.9	52.9	
630	2	21.2							21.0	63.6	63.8	63.0	63.0	63.0	63.0	
640	1	25.5														
650	1	36.1														
660	1	22.6														
670	1	13.3														
680	1	4.0														
690	1	7.5														
700	1	20.6														
Positive is wind from the tail (225°). Negative is wind from the head (45°).																

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 720	-9.0				-7.6	-6.6	-5.5	-3.4	-0.7	+0.5	+1.9	+3.2	+4.8	+7.0	+8.0	
1.0 720	-20.0				-14.2	-13.0	-10.5	-7.1	-1.2	+5.1	+9.3	+11.7	+13.9	+20.5	+21.0	
2.0 720	-22.0				-13.2	-10.3	-8.6	-4.6	+0.0	+6.6	+12.4	+15.9	+19.4	+31.0	+32.0	
3.0 720	-21.0				-9.9	-8.7	-6.0	-3.1	+1.2	+9.2	+15.8	+19.8	+21.4	+30.0	+31.0	
4.0 720	-14.0				-10.4	-9.0	-6.4	-1.9	+2.7	+10.4	+18.1	+21.9	+24.9	+31.0	+32.0	
5.0 720	-14.0				-10.3	-8.1	-5.7	-1.3	+4.7	+13.4	+21.0	+26.1	+29.2	+35.5	+36.0	
6.0 720	-15.0				-11.8	-8.8	-5.4	-0.6	+6.3	+16.9	+24.5	+30.5	+35.2	+39.0	+40.0	
7.0 720	-16.0				-12.5	-8.4	-5.8	-0.3	+8.4	+19.7	+28.7	+34.5	+38.8	+43.0	+44.0	
8.0 720	-19.0				-13.8	-9.3	-6.0	+0.2	+10.1	+22.3	+34.1	+39.5	+43.9	+50.0	+51.0	
9.0 720	-27.0				-15.7	-12.4	-6.5	+0.8	+12.8	+25.8	+38.2	+44.5	+48.8	+80.0	+81.0	
10.0 720	-31.0				-20.3	-13.8	-8.0	+1.0	+15.2	+29.3	+43.0	+49.9	+56.9	+86.0	+87.0	
11.0 720	-31.0				-20.3	-13.3	-8.3	+1.4	+17.1	+32.4	+46.8	+56.7	+60.9	+86.0	+87.0	
12.0 720	-31.0				-20.7	-13.8	-9.0	+1.6	+18.1	+33.9	+46.6	+59.5	+66.8	+88.0	+89.0	
13.0 720	-26.0				-16.8	-12.1	-6.3	+3.3	+19.0	+33.1	+44.6	+53.7	+63.4	+84.0	+85.0	
14.0 720	-23.0				-15.2	-9.4	-3.4	+4.2	+17.0	+30.4	+38.8	+46.5	+56.8	+68.0	+69.0	
15.0 720	-24.0				-11.8	-6.9	-2.5	+4.0	+15.2	+25.2	+32.8	+36.8	+43.8	+62.0	+63.0	
16.0 720	-15.0				-9.7	-5.9	-2.3	+2.9	+11.9	+20.4	+26.6	+29.9	+35.2	+44.4	+45.0	
17.0 720	-14.0				-9.3	-5.9	-2.5	+1.3	+8.0	+15.5	+21.2	+24.8	+26.7	+35.0	+36.0	
18.0 720	-11.0				-8.4	-6.6	-4.4	-0.3	+4.9	+11.2	+15.6	+17.8	+19.9	+27.0	+28.0	
19.0 720	-10.0				-6.8	-6.0	-4.5	-0.9	+2.8	+7.4	+12.6	+15.3	+17.9	+24.0	+25.0	
20.0 720	-8.0				-7.2	-6.0	-4.5	-1.6	+1.3	+5.9	+10.2	+12.9	+16.6	+22.5	+23.0	
21.0 720	-13.0				-7.9	-6.6	-4.9	-2.2	+1.0	+5.5	+9.8	+11.9	+17.6	+26.0	+27.0	
22.0 720	-12.0				-7.9	-6.9	-5.3	-2.6	+1.0	+5.8	+9.5	+13.7	+16.9	+26.0	+27.0	
23.0 720	-13.0				-9.5	-6.8	-5.5	-2.2	+6.7	+11.0	+13.7	+15.7	+24.5	+25.0		
24.0 720	-17.0				-10.3	-7.3	-6.1	-1.8	+2.9	+8.3	+12.2	+14.3	+15.9	+20.0	+21.0	
25.0 720	-17.0				-9.9	-8.2	-6.8	-1.6	+4.3	+9.8	+13.7	+15.7	+17.8	+27.0	+28.0	
26.0 720	-15.0				-10.9	-8.5	-6.5	-1.4	+5.2	+11.3	+15.3	+17.5	+18.9	+21.6	+22.0	
27.0 720	-21.0				-12.5	-8.7	-5.3	-0.4	+6.5	+13.4	+16.8	+18.7	+21.4	+25.0	+26.0	
28.0 84	-5.7				-7.0		-1.4	3.0	10.1	17.6	22.2	23.4	26.1	26.4	26.4	
29.0 90	-7.8				-4.0		-1.5	4.3	17.2	20.5	25.5	26.6	30.1	30.4	30.7	
30.0 90	-0.9				-5.0		-1.5	5.4	15.0	22.4	29.2	30.0	31.1	31.4	31.7	
31.0 91	-14.8				-7.0		1.5	5.6	14.0	24.1	27.4	31.0	32.7	33.2	33.2	
32.0 91	-4.1				-0.2		3.1	7.4	19.6	27.6	32.2	33.6	34.1	35.2	35.4	
33.0 92	-12.0				-3.0		3.6	10.5	19.4	30.5	34.3	36.0	41.1	41.4	41.9	
34.0 92	-14.8				-7.0		3.6	12.3	22.9	32.2	36.2	39.0	43.1	43.7	43.8	
35.0 92	-14.1				1.1		5.2	11.0	29.5	35.4	40.7	45.4	46.9	48.0	48.0	
36.0 90	-15.6				2.0		5.3	12.0	23.0	34.5	41.3	44.0	49.1	49.4	49.7	
37.0 91	-17.7				3.1		6.5	14.2	25.1	37.5	44.7	47.0	55.1	56.2	56.4	
38.0 94	-16.3				0.2		6.4	15.0	24.1	41.0	47.3	52.0	61.1	62.2	62.3	
39.0 94	-6.4				3.1		9.4	17.6	29.2	44.7	48.4	55.0	63.0	63.4	63.7	
40.0 93	-2.7				4.1		10.7	19.4	32.1	46.4	55.4	57.0	64.1	64.9	65.0	
41.0 93	-1.3				5.4		4.7	18.4	35.3	47.4	56.7	58.0	65.1	66.1	66.3	
42.0 93	-2.3				4.1		10.4	20.0	37.2	51.7	61.2	64.0	67.0	67.4	67.5	
43.0 92	-1.6				10.0		13.6	26.2	41.0	56.7	64.7	64.0	70.4	70.7	70.7	
44.0 84	5.5				13.5		18.4	28.7	43.0	61.0	73.4	81.3	81.7	82.0	82.0	
45.0 87	6.4				7.0		23.4	31.0	40.5	65.1	82.7	90.0	90.7	91.1	91.2	
46.0 86	2.1				10.0		25.2	34.7	50.0	72.4	92.7	94.7	99.1	99.4	99.7	
47.0 83	0.0				16.0		26.2	34.6	54.4	73.9	93.0	97.7	101.1	101.7	101.4	
48.0 82	0.0				15.0		29.6	41.0	54.5	74.0	91.3	97.1	99.3	100.3	100.4	
49.0 84	1.4				23.0		33.3	39.5	61.4	80.4	91.4	94.1	104.2	104.9	105.0	
50.0 84	3.5				25.0		32.2	40.7	63.0	79.4	92.4	97.1	104.1	104.4	104.7	
51.0 77	4.9				28.4		27.0	41.6	60.3	79.4	92.2	95.0	97.1	97.4	97.6	
52.0 74	3.5				24.3		27.7	42.0	59.5	80.1	86.7	95.3	99.2	99.6	99.7	
53.0 70	0.7				22.6		27.5	43.1	61.7	81.0	93.5	94.6	101.2	101.7	101.4	
54.0 51	-0.7				20.4		26.1	41.4	65.5	89.3	92.0	101.4	111.4	112.4	112.4	
55.0 52	-1.4				16.2		17.6	41.6	65.0	89.7	89.4	92.0	101.1	101.4	101.4	
56.0 47	0.7				12.1		21.2	40.5	60.5	83.5	87.4	89.0	95.4	96.1	96.2	
57.0 45	4.2				17.0		24.3	42.1	63.5	82.4	87.4	91.0	97.7	98.2	98.3	
58.0 34	17.8				24.9		43.0	62.0	82.0	92.1	93.2	93.7	94.1	94.1	94.1	
59.0 24	13.8				33.5		48.4	64.5	80.4	97.6	99.4	99.4	100.1	100.2	100.2	
60.0 21	26.9				20.1		51.3	70.3	82.7	89.0	102.4	102.4	102.4	102.4	102.4	
61.0 16	33.0				36.4		54.4	85.4	95.4	103.3	103.3	103.3	103.3	103.3	103.3	
62.0 15	29.9				39.4		55.7	85.5	95.5	103.3	103.3	103.3	103.3	103.3	103.3	
63.0 11	21.5				35.7		44.5	70.0	81.7	87.7	87.7	87.7	87.7	87.7	87.7	
64.0 7	29.8															
65.0 6	42.4															
66.0 4	32.2															
67.0 4	12.9															
68.0 4	3.4															
69.0 3	-21.0															
70.0 2	-37.3															

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE / 4.12

DATA SOURCE										DECEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-8.0	-7.9	-7.0	-6.0	-4.7		-2.5	-0.6	-0.9	-2.6	-4.1	-5.1	-6.9	-8.0		
1.0	744	-15.0		-12.4	-11.0	-9.2		-5.4	-0.0	-6.4	-10.7	-12.7	-14.9	-18.9	-25.0		
2.0	744	-17.0		-12.9	-10.3	-8.7		-6.6	-2.4	-2.3	-8.8	-14.4	-17.6	-20.3	-28.9		
3.0	744	-23.0		-12.9	-8.8	-6.3	-4.0	-0.9	-4.4	-11.8	-18.1	-20.4	-25.1	-29.9			
4.0	744	-19.0		-10.9	-7.2	-6.1	-3.4	-0.0	-6.8	-15.5	-22.2	-25.5	-29.5	-34.9			
5.0	744	-18.0		-14.9	-8.3	-4.9	-3.3	-1.2	-9.5	-19.2	-25.9	-31.2	-36.5	-41.9			
6.0	744	-20.0		-19.9	-6.8	-4.7	-2.5	-2.6	-11.9	-22.4	-28.8	-34.5	-41.5	-45.9			
7.0	744	-21.0		-19.9	-8.7	-5.0	-2.1	-3.8	-14.3	-25.0	-33.9	-40.0	-45.8	-52.9			
8.0	744	-20.0		-18.9	-8.5	-5.5	-2.1	-4.8	-16.6	-28.7	-40.4	-45.5	-53.7	-64.9			
9.0	744	-33.0		-19.9	-11.2	-6.7	-3.3	-5.8	-18.9	-34.2	-45.6	-52.4	-57.5	-67.9			
10.0	744	-29.0		-22.9	-11.5	-6.0	-3.2	-6.3	-21.2	-38.5	-50.4	-57.0	-61.7	-73.9			
11.0	744	-20.0		-17.9	-11.5	-9.0	-3.4	-6.8	-23.2	-41.5	-53.4	-60.0	-67.1	-78.9			
12.0	744	-15.0		-13.9	-10.2	-7.2	-1.7	-7.9	-25.5	-43.3	-55.9	-63.0	-67.5	-82.9			
13.0	744	-12.0		-10.9	-7.1	-3.6	-1.7	-10.1	-25.7	-42.8	-55.9	-61.5	-68.1	-76.9			
14.0	744	-11.0		-8.9	-2.2	-0.2	-2.8	-11.4	-24.6	-39.2	-50.7	-57.8	-65.5	-70.9			
15.0	744	-10.0		-9.9	-1.8	-0.3	-3.3	-10.9	-22.0	-34.6	-42.8	-48.8	-57.7	-64.9			
16.0	744	-9.0		-6.9	-2.7	-0.5	-2.8	-8.9	-19.1	-29.0	-37.2	-41.5	-49.5	-58.0			
17.0	744	-12.0		-11.9	-4.6	-2.2	-0.4	-7.3	-15.4	-24.0	-31.7	-36.0	-40.1	-48.9			
18.0	744	-8.0		-5.3	-2.2	-0.4	-0.4	-4.1	-11.0	-19.4	-25.9	-29.0	-32.2	-37.9			
19.0	744	-8.0		-7.9	-5.5	-3.0	-0.9	-1.1	-6.7	-14.6	-21.1	-23.8	-26.8	-32.4			
20.0	744	-4.0		-5.8	-3.8	-2.1	-0.1	-0.1	-4.3	-11.2	-17.8	-20.7	-23.7	-31.4			
21.0	744	-9.0		-8.9	-6.2	-5.0	-3.1	-0.7	-3.8	-10.3	-15.4	-19.5	-24.8	-28.9			
22.0	744	-9.0		-8.9	-7.3	-5.7	-4.1	-0.6	-3.7	-9.4	-14.5	-17.3	-19.6	-25.9			
23.0	744	-13.0		-9.9	-7.6	-6.3	-4.4	-0.6	-4.7	-10.7	-14.9	-18.2	-21.1	-24.9			
24.0	744	-10.0		-9.2	-7.0	-3.9	-0.0	-6.1	-12.7	-17.4	-20.6	-23.8	-28.9	-32.0			
25.0	744	-21.0		-19.9	-9.5	-7.0	-4.4	-1.1	-7.8	-14.6	-20.2	-22.5	-26.0	-30.9			
26.0	744	-16.0		-13.9	-10.7	-7.0	-4.4	-1.3	-8.8	-16.6	-22.1	-25.1	-28.2	-32.4			
27.0	744	-21.0		-19.9	-12.1	-8.6	-4.8	-2.2	-10.3	-18.1	-22.9	-27.0	-29.2	-31.9			
28.0	132	-19.8		-11.7	-10.5	-6.4	0.4	12.5	22.3	25.2	27.4	29.5	30.3	30.4			
29.0	134	-21.2		-10.7	-8.7	-7.6	0.4	15.0	22.9	27.1	29.0	31.7	36.2	36.4			
30.0	139	-21.9		-11.6	-8.4	-4.4	0.7	17.1	26.3	31.7	33.4	34.6	35.0	34.2			
31.0	140	-17.7		-11.6	-6.0	-0.3	2.1	20.4	29.1	33.5	37.4	43.4	44.0	45.3			
32.0	141	-15.6		-9.6	-6.0	-1.7	2.4	22.5	30.1	34.5	40.4	44.4	52.1	52.3			
33.0	141	-17.0		-4.4	-6.4	-3.0	1.7	25.1	31.3	39.0	46.4	53.4	62.0	62.2			
34.0	141	-21.9		-7.0	-7.4	-4.5	0.3	25.1	35.1	46.5	52.4	56.5	62.0	62.2			
35.0	141	-21.9		-14.6	-6.4	-6.0	0.7	22.9	37.0	49.0	55.4	55.0	56.4	56.6			
36.0	141	-19.1		-13.6	-9.4	-7.0	0.5	25.1	34.2	49.0	56.4	63.3	53.4	63.0			
37.0	141	-21.0		-17.6	-11.4	-7.0	-0.4	24.2	39.2	52.0	56.4	57.4	71.0	71.2			
38.0	141	-24.4		-13.4	-6.4	-6.4	0.2	20.1	42.4	52.5	62.0	64.4	70.4	70.4			
39.0	142	-24.3		-25.4	-11.4	-8.0	-0.2	32.1	41.0	51.0	60.4	63.4	64.4	64.5			
40.0	142	-34.2		-29.4	-13.4	-8.9	-1.1	33.0	46.1	51.5	59.4	63.7	64.3	64.3			
41.0	142	-34.8		-33.4	-14.4	-8.0	-0.2	33.0	47.4	54.4	57.4	61.4	65.0	65.2			
42.0	140	-44.3		-36.4	-13.4	-12.0	1.6	34.0	44.4	57.0	58.4	60.4	62.7	62.9			
43.0	134	-40.3		-34.4	-15.4	-9.1	0.5	32.5	44.0	56.5	60.0	61.7	62.3	62.4			
44.0	140	-36.2		-32.4	-14.4	-9.0	0.2	29.4	44.9	57.7	62.4	65.4	64.5	64.6			
45.0	134	-31.1		-17.0	-17.0	-7.1	1.4	24.0	51.4	59.4	62.0	65.4	67.7	67.9			
46.0	137	-29.0		-25.4	-20.0	-4.1	1.7	27.1	53.5	61.4	64.4	67.4	70.4	70.7			
47.0	134	-24.3		-17.0	-6.1	-6.1	1.4	24.0	57.4	64.5	69.0	71.4	75.4	75.5			
48.0	134	-30.6		-24.4	-7.0	-4.7	2.3	24.0	57.4	64.5	74.0	79.4	80.4	81.0			
49.0	130	-25.6		-25.0	-16.0	-3.7	1.7	27.0	54.5	70.5	74.0	74.0	81.7	81.4			
50.0	122	-22.1		-21.7	-10.4	-4.4	3.5	24.4	56.3	71.7	74.1	80.7	81.4	81.9			
51.0	127	-24.3		-21.4	-17.2	-6.0	3.2	24.5	59.6	72.0	77.0	80.4	92.6	82.7			
52.0	115	-34.2		-20.0	-20.2	-9.2	3.2	23.4	54.7	72.3	81.4	82.0	90.5	90.6			
53.0	110	-44.8		-21.0	-19.5	-11.5	2.5	22.0	54.5	74.5	81.5	87.0	102.2	102.4			
54.0	102	-24.3		-18.0	-12.4	-12.4	1.1	22.3	56.4	74.0	84.7	93.0	104.2	104.4			
55.0	92	-31.8		-17.0	-15.4	-15.4	2.3	25.0	55.0	81.4	84.0	96.1	96.0	97.0			
56.0	81	-22.6		-15.2	-10.9	-10.9	3.4	27.5	65.0	86.0	94.2	117.3	114.3	118.5			
57.0	67	-21.6		-21.5	-16.6	-16.6	2.6	27.5	67.4	84.7	90.4	90.0	91.2	91.2			
58.0	51	-27.0		-23.4	-14.4	-14.4	3.1	20.3	54.5	84.5	94.4	95.1	95.4	95.5			
59.0	39	-24.8			-24.5	-24.5	0.2	20.5	51.4	84.1	114.1	114.4	114.2	115.3			
60.0	22	-34.4			-31.9	-31.9	-2.5	20.4	47.5	96.0	131.4	132.0	132.2	132.2			
61.0	14	-34.6					5.4	23.5	64.4	113.3	113.0	114.1	114.3	114.3			
62.0	4	14.8					19.3	35.0	45.7	126.5	126.7	126.4	126.0	126.9			
63.0	2	45.1						45.0	44.6	44.4	44.0	44.4	44.4	44.4			
64.0	1	54.3												53.3			

Positive is wind from the tail (225°).
Negative is wind from the head (45°).

HEAD AND TAIL WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 4.13

DATA SOURCE										ANNUAL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 8766	-17.0	-11.0	-7.6	-6.3	-4.9	-2.8	-0.6	+1.2	+3.0	+4.2	+5.6	+8.8	+13.0			
1+U 8766	-23.0	-17.0	-12.5	-10.6	-8.4	-4.6	-0.0	+5.6	+10.5	+13.7	+16.8	+24.0	+30.0			
2+0 8766	-22.0	-17.5	-11.2	-9.0	-6.8	-3.1	+1.1	+7.5	+13.3	+17.5	+20.8	+27.5	+36.0			
3+0 8766	-23.0	-16.0	-9.7	-7.7	-5.6	-2.4	+2.1	+9.7	+17.0	+20.7	+24.7	+31.5	+46.0			
4+0 8766	-22.0	-15.6	-9.4	-7.4	-5.5	-2.0	+3.0	+12.1	+20.1	+24.4	+28.3	+36.6	+48.0			
5+0 766	-24.0	-16.3	-9.6	-7.4	-5.4	-1.8	+3.9	+15.0	+23.6	+28.2	+33.4	+43.5	+58.0			
6+3 8766	-29.0	-16.7	-10.2	-7.9	-5.7	-1.9	+4.8	+18.1	+27.5	+32.8	+37.3	+48.0	+64.0			
7+0 8766	-31.0	-19.0	-11.3	-8.7	-6.3	-2.1	+6.0	+21.0	+31.6	+38.1	+43.9	+55.5	+70.0			
8+0 8766	-30.0	-20.4	-12.6	-9.7	-7.0	-2.3	+7.2	+23.9	+35.9	+42.5	+49.6	+63.0	+78.0			
9+U 8766	-33.0	-21.2	-14.4	-11.4	-8.4	-2.8	+8.6	+27.3	+40.4	+48.3	+55.0	+69.0	+81.0			
10+0 8766	-32.0	-25.6	-17.4	-13.3	-9.8	-3.5	+9.8	+30.9	+44.9	+52.1	+59.2	+74.0	+87.0			
11+0 8766	-38.0	-30.5	-19.7	-15.1	-11.4	-3.9	+11.2	+33.9	+48.1	+56.1	+63.6	+83.1	+102.0			
12+0 8766	-42.0	-31.3	-21.8	-17.3	-12.7	-4.5	+12.6	+35.9	+50.3	+58.0	+65.8	+82.5	+99.0			
13+0 8766	-43.0	-32.0	-22.7	-18.1	-13.5	-4.9	+13.6	+35.6	+48.4	+55.9	+63.2	+78.5	+94.0			
14+0 8766	-37.0	-28.7	-21.2	-17.0	-13.0	-5.1	+12.7	+32.4	+44.3	+51.2	+57.1	+69.0	+76.0			
15+0 8766	-31.0	-24.0	-17.8	-14.5	-11.3	-4.9	+10.5	+28.3	+38.3	+43.7	+49.0	+60.4	+72.0			
16+0 8766	-24.0	-19.9	-14.6	-12.3	-9.7	-4.7	+7.6	+23.7	+32.4	+37.5	+41.5	+50.7	+58.0			
17+0 8766	-23.0	-16.3	-12.5	-10.8	-9.1	-5.3	+4.5	+18.9	+26.5	+31.6	+35.6	+42.5	+55.0			
18+0 8766	-21.0	-15.5	-12.2	-10.7	-9.3	-6.1	+1.0	+13.5	+20.9	+25.0	+28.8	+37.2	+44.0			
19+0 8766	-24.0	-16.0	-13.2	-11.9	-10.4	-7.3	-0.3	+8.7	+15.4	+19.8	+23.8	+32.7	+44.0			
20+0 8766	-26.0	-17.6	-14.9	-13.5	-11.9	-8.6	-1.4	+5.6	+11.5	+15.5	+19.1	+26.7	+38.0			
21+0 8766	-31.0	-18.9	-15.7	-14.2	-12.7	-9.5	-2.6	+3.9	+9.2	+12.3	+16.1	+25.3	+33.0			
22+0 8766	-28.0	-19.8	-16.7	-15.2	-13.6	-10.4	-3.3	+3.3	+8.3	+11.6	+15.3	+24.8	+30.0			
23+0 8766	-28.0	-20.8	-17.9	-16.5	-14.6	-11.1	-3.8	+3.2	+8.7	+11.8	+15.5	+24.0	+35.0			
24+0 8766	-28.0	-22.5	-18.4	-17.0	-15.5	-11.9	-3.9	+4.1	+9.6	+13.4	+16.2	+24.4	+38.0			
25+0 8766	-33.0	-22.9	-19.7	-18.1	-16.2	-12.6	-4.1	+5.3	+11.3	+14.9	+18.6	+26.5	+33.0			
26+0 8766	-29.0	-24.0	-20.2	-18.8	-17.0	-13.0	-3.9	+6.2	+13.3	+17.3	+21.3	+30.1	+45.0			
27+0 8766	-37.0	-26.0	-21.7	-19.7	-17.8	-13.6	-3.5	+7.2	+15.0	+19.0	+23.0	+33.0	+41.0			
28+U 1199	-25.3	-24.4	-21.7	-20.5	-18.0	-13.0	-1.4	+1.2	+2.0	+2.0	+2.0	+2.0	+3.0			
29+U 1224	-26.1	-25.3	-22.1	-20.0	-18.5	-13.0	-1.7	+1.4	+2.1	+2.4	+2.7	+3.0	+3.0			
30+U 1246	-25.5	-22.6	-20.6	-18.5	-16.5	-13.7	-1.2	+1.9	+2.2	+2.7	+3.0	+3.5	+3.2			
31+U 1262	-38.7	-25.8	-23.7	-21.0	-18.3	-13.0	-1.7	+1.8	+2.0	+2.4	+2.7	+3.0	+3.5			
32+U 1274	-31.2	-27.3	-21.4	-19.1	-17.5	-13.5	0.7	+2.0	+2.9	+3.2	+3.4	+4.3	+5.3			
33+U 1299	-38.4	-35.2	-22.8	-21.5	-19.0	-14.0	0.0	+2.1	+3.0	+3.4	+3.8	+5.2	+6.2			
34+U 1316	-40.8	-38.2	-25.0	-22.6	-19.8	-14.6	0.5	+2.1	+3.1	+3.5	+4.2	+5.6	+6.2			
35+U 1331	-47.5	-42.2	-28.3	-24.6	-21.5	-15.5	0.4	+2.1	+3.3	+3.8	+4.5	+5.7	+6.6			
36+U 1333	-48.7	-45.2	-29.1	-25.0	-22.1	-16.5	0.5	+2.1	+3.4	+3.9	+4.6	+5.8	+6.9			
37+U 1339	-54.0	-45.2	-30.0	-25.0	-22.4	-17.5	0.5	+2.0	+3.4	+4.0	+4.7	+5.7	+6.7			
38+U 1346	-50.6	-45.2	-30.4	-28.2	-24.4	-18.1	0.5	+2.0	+3.4	+4.0	+4.7	+5.7	+6.7			
39+U 1355	-48.8	-44.2	-32.7	-28.7	-25.6	-18.5	0.7	+2.0	+3.7	+4.3	+5.0	+6.1	+7.1			
40+U 1357	-45.4	-34.0	-30.0	-27.1	-24.0	-19.0	0.3	+2.7	+4.1	+4.8	+5.0	+6.3	+7.3			
41+U 1357	-46.7	-35.5	-32.8	-29.0	-25.6	-19.5	0.8	+2.9	+4.2	+5.0	+5.6	+6.6	+7.6			
42+U 1349	-52.0	-45.2	-36.8	-32.0	-28.3	-22.5	1.4	+3.0	+4.4	+4.8	+5.3	+6.7	+7.6			
43+U 1334	-50.9	-44.2	-37.0	-34.8	-31.7	-20.3	1.5	+3.2	+4.7	+5.6	+6.1	+7.4	+8.4			
44+U 1322	-56.6	-45.2	-40.0	-36.5	-32.0	-24.0	2.1	+3.4	+5.0	+5.7	+6.4	+7.4	+8.4			
45+U 1305	-50.2	-45.2	-39.5	-37.3	-33.3	-24.0	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
46+U 1297	-57.0	-49.4	-40.0	-37.0	-33.3	-24.0	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
47+U 1261	-54.7	-58.3	-42.5	-38.4	-33.5	-23.8	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
48+U 1234	-52.6	-48.3	-42.6	-38.6	-33.3	-23.7	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
49+U 1214	-50.9	-53.4	-43.0	-39.3	-34.8	-23.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
50+U 1178	-60.3	-52.4	-43.1	-40.0	-35.5	-22.7	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
51+U 1131	-66.5	-61.5	-42.0	-39.4	-35.5	-23.8	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
52+U 1071	-74.8	-50.6	-44.3	-40.0	-35.7	-24.1	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
53+U 1011	-60.6	-57.6	-45.4	-42.3	-37.4	-24.0	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
54+U 928	-61.0	-58.7	-45.7	-42.4	-37.0	-24.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
55+U 880	-59.7	-53.0	-45.2	-41.6	-36.0	-25.3	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
56+U 743	-56.2	-54.0	-44.0	-40.0	-35.0	-25.7	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
57+U 640	-54.3	-47.3	-43.5	-39.5	-35.5	-25.7	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
58+U 515	-55.1	-40.6	-45.3	-40.6	-36.0	-27.1	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
59+U 393	-67.8	-49.1	-45.1	-40.9	-36.0	-28.2	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
60+U 273	-67.4	-52.6	-49.4	-44.3	-39.5	-31.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
61+U 184	-66.3	-60.1	-52.7	-48.3	-43.5	-35.2	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
62+U 124	-60.7	-64.0	-55.2	-50.4	-45.5	-37.3	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
63+U 76	-82.7	-76.3	-65.2	-60.4	-55.5	-47.3	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
64+U 43	-78.2	-76.3	-65.2	-60.4	-55.5	-47.3	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
65+U 38	-62.6	-60.7	-55.2	-50.4	-45.5	-37.3	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
66+U 29	-54.8	-54.8	-47.3	-43.5	-39.5	-35.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
67+U 25	-105.2	-54.8	-47.3	-43.5	-39.5	-35.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
68+U 20	-60.1	-54.8	-47.3	-43.5	-39.5	-35.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
69+U 26	-25.5	-54.8	-47.3	-43.5	-39.5	-35.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			
70+U 25	-46.0	-54.8	-47.3	-43.5	-39.5	-35.5	0.3	+3.2	+4.8	+5.5	+6.1	+7.1	+8.1			

Positive is wind from the tail (225°)
Negative is wind from the head (45°).

DATA SOURCE											JANUARY				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.000	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)
5FC 744	-10.0				-9.3	-7.9	-6.9	-4.5	-1.2	+1.4	+3.5	+4.5	+5.6	+7.4	+8.0
1.0 744	-22.0			-20.9	-18.1	-14.7	-12.9	-8.3	-0.9	+4.1	+7.7	+9.1	+11.5	+13.9	+18.0
2.0 744	-25.0				-21.8	-19.0	-15.1	-10.9	-3.9	+1.2	+4.6	+6.3	+7.7	+11.9	+17.0
3.0 744	-35.0			-30.9	-25.8	-22.0	-19.2	-13.3	-6.4	-0.3	+3.0	+4.5	+6.6	+11.9	+13.0
4.0 744	-38.0			-35.9	-31.2	-27.0	-22.4	-15.8	-8.6	-1.7	+1.5	+3.1	+5.5	+11.9	+15.0
5.0 744	-46.0			-40.9	-36.1	-30.6	-25.3	-18.5	-10.9	-3.4	-0.0	+2.0	+4.5	+13.9	+20.0
6.0 744	-48.0			-45.9	-39.7	-33.0	-28.1	-21.5	-12.9	-5.0	-1.4	+0.2	+3.8	+13.9	+24.0
7.0 744	-57.0			-52.9	-43.7	-37.0	-31.8	-23.9	-15.1	-6.8	-2.0	-0.2	+3.2	+12.9	+22.0
8.0 744	-67.0			-55.9	-46.5	-42.6	-35.1	-27.1	-17.4	-8.2	-2.3	+0.1	+1.7	+13.9	+18.0
9.0 744	-62.0				-53.7	-45.6	-39.5	-30.3	-19.5	-9.6	-2.8	-0.2	+4.5	+13.9	+16.0
10.0 744	-65.0			-61.9	-54.5	-50.2	-42.9	-33.2	-21.4	-11.5	-5.3	-1.6	+3.2	+16.9	+18.0
11.0 744	-79.0			-67.9	-63.7	-54.0	-46.9	-36.5	-24.0	-13.2	-6.3	-3.3	+3.5	+12.9	+20.0
12.0 744	-76.0			-70.9	-59.8	-55.0	-48.5	-38.1	-25.7	-15.2	-8.4	-3.9	+0.5	+11.9	+14.0
13.0 744	-77.0				-55.5	-51.0	-46.6	-37.3	-26.7	-16.2	-10.2	-5.9	+1.8	+3.9	+12.0
14.0 744	-71.0			-63.9	-51.5	-46.2	-41.7	-35.2	-25.8	-16.3	-10.6	-6.4	+2.4	+5.9	+7.0
15.0 744	-59.0			-58.9	-45.5	-42.0	-37.8	-31.2	-22.9	-14.7	-9.1	-6.1	+0.8	+4.9	+7.0
16.0 744	-47.0				-38.5	-35.3	-32.3	-27.2	-19.3	-12.2	-7.2	-4.1	+2.1	+1.9	+5.0
17.0 744	-40.0			-34.9	-32.1	-30.8	-27.4	-22.6	-16.1	-9.4	-5.0	-2.3	+0.2	+3.9	+5.0
18.0 744	-32.0			-29.9	-27.0	-24.8	-22.1	-17.7	-11.7	-6.0	-2.1	-0.8	+0.6	+3.9	+6.0
19.0 744	-34.0			-31.9	-23.7	-21.1	-18.0	-13.2	-7.8	-3.2	-0.5	+0.7	+2.2	+4.9	+5.0
20.0 744	-30.0			-25.9	-19.1	-16.6	-14.1	-9.8	-5.3	-1.2	-0.0	+2.0	+2.9	+9.9	+12.0
21.0 744	-23.0			-22.9	-18.6	-16.2	-12.8	-8.8	-3.7	-0.3	+1.8	+4.6	+6.5	+12.9	+14.0
22.0 744	-30.0			-26.9	-18.5	-15.5	-11.9	-7.9	-2.8	+0.5	+4.3	+6.7	+8.7	+11.9	+16.0
23.0 744	-26.0			-25.9	-17.3	-14.6	-11.3	-7.4	-2.4	+1.7	+5.5	+7.1	+9.7	+21.4	+22.0
24.0 744	-25.0			-23.9	-17.5	-15.0	-11.8	-8.2	-2.7	+2.7	+7.0	+9.4	+11.7	+19.9	+24.0
25.0 744	-28.0			-21.9	-18.7	-16.2	-13.9	-9.3	-3.2	+2.5	+6.8	+9.5	+13.2	+21.9	+29.0
26.0 744	-32.0			-27.9	-23.7	-21.0	-16.5	-10.8	-4.0	+3.1	+7.9	+12.7	+17.2	+19.9	+27.0
27.0 744	-32.0			-25.9	-21.8	-20.1	-17.8	-12.8	-4.4	+4.6	+11.5	+15.0	+20.5	+26.9	+28.0
28.0 105	-24.1				-21.4	-16.9	-11.8	-5.6	-7.6	14.4	19.4	24.0	25.0	25.0	25.2
29.0 107	-35.8				-24.4	-20.6	-14.4	-4.1	5.0	20.7	24.4	25.0	25.0	25.0	26.1
30.0 108	-29.8			-20.7	-24.5	-21.4	-17.0	-6.4	7.9	23.0	25.4	25.0	25.0	27.4	29.0
31.0 109	-32.5			-26.7	-26.1	-24.8	-19.7	-7.4	13.4	25.6	30.4	31.0	34.4	34.4	35.1
32.0 113	-32.5			-31.0	-30.4	-27.2	-21.4	-8.1	14.0	25.4	33.0	33.0	34.4	34.4	35.0
33.0 115	-36.8			-34.4	-31.4	-27.4	-23.4	-12.1	14.9	29.1	34.0	34.0	34.4	35.0	36.1
34.0 117	-34.7			-34.4	-31.4	-30.6	-26.7	-12.4	16.4	31.2	34.7	40.4	43.6	43.6	43.7
35.0 116	-41.9			-37.4	-36.4	-34.4	-27.0	-12.0	12.6	41.2	51.0	52.4	54.4	54.4	54.4
36.0 118	-44.7			-40.0	-37.4	-32.6	-28.0	-12.0	10.5	43.2	50.4	52.0	53.7	53.4	53.4
37.0 114	-44.7			-37.4	-36.4	-31.4	-27.0	-11.5	10.4	45.3	49.4	52.4	54.4	54.4	55.0
38.0 115	-45.2			-37.4	-36.4	-31.4	-27.0	-11.5	10.4	45.3	49.4	52.4	54.4	54.4	55.0
39.0 117	-34.2			-36.4	-35.1	-32.7	-26.4	-12.7	11.4	46.2	55.4	61.4	65.1	65.1	65.1
40.0 114	-37.3				-36.4	-33.6	-25.4	-14.4	9.4	31.4	50.7	57.4	75.2	75.4	75.4
41.0 117	-34.1				-33.1	-30.1	-26.7	-15.4	9.4	39.2	49.4	54.4	75.5	75.5	75.5
42.0 114	-34.9				-35.2	-31.1	-24.1	-11.9	10.1	30.4	46.0	64.0	71.4	73.4	73.4
43.0 113	-37.8				-37.4	-33.3	-25.6	-10.5	11.1	30.4	39.4	53.0	76.2	76.4	76.4
44.0 113	-37.8				-43.0	-38.5	-35.7	-24.7	-4.0	10.4	31.2	39.4	67.1	67.1	67.1
45.0 111	-44.9				-42.0	-41.5	-36.5	-32.2	-4.4	4.4	26.5	30.4	54.2	71.0	71.2
46.0 110	-44.7				-44.0	-43.5	-34.7	-23.2	-7.1	10.7	23.4	34.4	66.2	70.0	70.1
47.0 106	-54.2				-42.0	-39.6	-31.4	-23.2	-4.0	10.2	22.4	34.4	53.0	60.0	61.0
48.0 104	-57.2				-50.0	-40.4	-34.0	-24.4	-10.0	4.0	18.0	26.7	40.0	40.0	41.0
49.0 100	-59.0				-51.0	-44.0	-37.4	-26.0	-11.7	6.5	17.1	21.4	46.1	47.1	47.1
50.0 100	-60.5				-44.0	-40.3	-32.0	-13.0	5.0	12.4	24.0	47.1	47.1	47.9	48.0
51.0 95	-44.1				-48.1	-41.0	-35.0	-14.5	4.4	14.0	21.1	43.2	44.1	44.1	44.1
52.0 84	-64.2				-51.4	-49.2	-36.4	-17.5	-0.2	15.4	20.7	39.4	34.4	34.4	34.7
53.0 72	-64.4				-62.5	-49.8	-37.9	-20.0	1.4	14.4	23.4	24.5	20.2	29.3	29.3
54.0 72	-64.4				-51.7	-46.1	-41.0	-22.7	-3.5	13.2	15.7	24.4	24.4	25.3	25.5
57.0 46	-75.8				-62.0	-61.1	-45.7	-22.0	-5.1	7.7	11.0	24.4	25.4	25.4	25.5
58.0 26	-78.0					-72.7	-40.9	-22.5	-7.1	4.7	4.4	4.4	4.4	4.4	4.4
59.0 18	-67.6						-56.1	-22.0	-7.6	1.1	1.7	1.4	2.1	2.1	2.1
60.0 10	-59.3						-50.0	-27.0	-12.4	-6.7	-6.4	-6.4	-6.4	-6.4	-6.4
61.0 7	-57.9						-34.0	-26.5	-11.1	-9.4	-9.4	-9.4	-9.4	-9.4	-9.4
62.0 6	-53.1							-33.0	-14.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
63.0 5	-45.1							-34.5	-13.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
64.0 4	-34.2							-34.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
65.0 3	-36.3							-24.5	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4
66.0 3	-36.4							-27.5	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2
67.0 3	-42.1							-31.4	-31.1	-31.1	-31.1	-31.1	-31.1	-31.1	-31.1
68.0 4	-60.3							-41.0	-27.7	-27.7	-27.7	-27.7	-27.7	-27.7	-27.7
69.0 4	-84.9							-36.0	-23.4	-23.4	-23.4	-23.4	-23.4	-23.4	-23.4
70.0 4	-84.9							-24.0	-14.5	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0

Positive is wind from the right (135°).
Negative is wind from the left (315°).

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH TABLE 5.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	678	-10.0			-9.2	-7.8	-6.9	-6.4	-6.0	-5.7	-5.4	-5.1	-4.8	-4.5	-4.2	-4.0
1.0	678	-24.0			-17.7	-15.7	-14.4	-10.7	-8.0	-5.3	-2.6	+0.1	+2.8	+5.5	+8.2	+11.0
2.0	678	-29.0			-25.2	-22.5	-18.5	-10.7	-3.5	+1.8	+5.7	+8.2	+9.4	+10.9	+13.0	+16.0
3.0	678	-38.0			-30.8	-27.1	-20.5	-13.7	-6.0	+0.2	+3.4	+5.3	+6.0	+7.0	+9.4	+12.5
4.0	678	-47.0			-34.6	-31.1	-23.0	-14.0	-7.4	-0.5	+3.5	+5.3	+7.0	+9.4	+12.5	+16.0
5.0	678	-59.0			-40.6	-35.5	-27.0	-16.7	-9.7	-1.7	+1.6	+4.5	+7.4	+9.4	+12.5	+17.0
6.0	678	-57.0			-42.4	-35.5	-29.2	-21.5	-12.4	-3.3	+0.0	+3.3	+5.8	+7.4	+10.0	+17.0
7.0	678	-57.0			-44.2	-38.6	-32.4	-24.0	-14.7	-5.2	-0.4	+1.9	+5.8	+7.4	+10.0	+17.0
8.0	678	-64.0			-47.6	-41.7	-35.8	-28.1	-17.0	-7.3	-0.8	+1.5	+7.4	+9.4	+12.5	+17.0
9.0	678	-65.0			-50.2	-44.5	-40.5	-31.5	-19.8	-8.9	-2.0	+1.7	+8.6	+10.0	+12.5	+17.0
10.0	678	-63.0			-56.4	-49.7	-44.5	-34.7	-22.6	-10.9	-3.9	+1.4	+8.7	+10.0	+12.5	+17.0
11.0	678	-67.0			-60.5	-53.6	-47.4	-38.0	-24.8	-12.4	-4.8	-0.1	+5.6	+7.4	+10.0	+17.0
12.0	678	-75.0			-60.6	-57.1	-50.0	-39.1	-26.0	-14.4	-7.9	-3.4	+1.2	+12.5	+16.0	+17.0
13.0	678	-63.0			-54.0	-50.9	-47.1	-38.3	-26.8	-16.1	-9.4	-2.7	+9.4	+10.0	+12.5	+17.0
14.0	678	-53.0			-49.2	-45.8	-41.8	-35.5	-25.4	-16.2	-8.3	-5.4	+3.1	+10.0	+11.0	+17.0
15.0	678	-58.0			-45.1	-41.3	-37.7	-31.5	-22.5	-13.6	-6.9	-4.9	+2.5	+10.0	+11.0	+17.0
16.0	678	-45.0			-39.0	-36.6	-33.5	-27.7	-19.1	-10.8	-5.6	-4.0	+2.1	+10.0	+11.0	+17.0
17.0	678	-38.0			-33.7	-32.2	-28.6	-22.9	-15.8	-8.8	-3.4	-1.4	+0.2	+2.5	+3.0	+17.0
18.0	678	-31.0			-26.8	-25.3	-22.7	-18.4	-11.5	-5.8	-1.8	-0.6	+0.1	+3.5	+4.0	+17.0
19.0	678	-34.0			-23.7	-19.6	-17.3	-13.1	-7.7	-2.4	-0.2	+1.5	+3.4	+5.5	+6.0	+17.0
20.0	678	-24.0			-17.6	-15.5	-13.1	-9.3	-4.3	-0.2	+2.7	+4.9	+6.9	+12.0	+13.0	+17.0
21.0	678	-19.0			-17.3	-14.7	-11.6	-7.8	-2.6	+0.8	+4.2	+5.9	+8.3	+11.0	+12.0	+17.0
22.0	678	-26.0			-17.1	-13.7	-10.9	-7.0	-1.8	+1.5	+5.4	+7.6	+9.7	+17.0	+18.0	+17.0
23.0	678	-18.0			-14.2	-12.2	-9.4	-6.1	-1.2	+2.3	+6.3	+7.9	+10.6	+24.0	+25.0	+17.0
24.0	678	-21.0			-14.2	-11.5	-9.0	-6.0	-1.7	+2.7	+6.6	+10.5	+12.7	+18.0	+19.0	+17.0
25.0	678	-18.0			-14.1	-12.1	-9.9	-6.5	-2.0	+2.2	+7.2	+9.8	+13.8	+22.0	+23.0	+17.0
26.0	678	-17.0			-14.0	-12.6	-11.2	-7.3	-2.5	+2.5	+8.0	+12.3	+17.7	+27.0	+28.0	+17.0
27.0	678	-19.0			-15.8	-14.5	-12.4	-8.4	-3.0	+3.4	+8.2	+12.7	+19.2	+27.0	+28.0	+17.0
28.0	82	-16.7				-15.6	-13.9	-10.0	-4.6	2.4	7.5	9.4	12.2	13.1	13.2	+17.0
29.0	82	-14.7				-17.1	-15.1	-11.5	-6.7	1.5	6.2	8.7	9.0	9.2	9.3	+17.0
30.0	81	-24.7				-23.2	-17.0	-13.5	-6.9	0.7	5.1	10.2	11.1	11.5	11.6	+17.0
31.0	81	-25.0				-21.5	-18.9	-15.0	-9.1	0.4	5.0	11.1	11.6	11.8	11.9	+17.0
32.0	81	-24.7				-24.2	-21.0	-18.0	-8.7	-0.1	7.0	11.2	12.1	12.4	12.7	+17.0
33.0	84	-34.6				-26.0	-24.4	-21.1	-12.5	-1.0	7.4	9.0	12.1	13.0	13.1	+17.0
34.0	94	-30.0				-28.9	-26.6	-23.0	-16.2	-2.4	7.1	13.2	13.4	13.9	13.9	+17.0
35.0	100	-36.1			-36.0	-29.4	-27.9	-25.4	-15.0	-5.4	6.0	9.0	12.0	14.0	14.1	+17.0
36.0	102	-41.7			-36.0	-30.7	-28.3	-24.1	-15.3	-5.0	4.0	9.0	12.0	14.0	14.1	+17.0
37.0	105	-41.0			-40.0	-29.4	-28.4	-25.2	-16.4	-4.4	6.0	9.4	15.0	16.3	16.5	+17.0
38.0	107	-37.5			-34.0	-33.1	-31.2	-24.8	-17.1	-5.0	9.7	11.4	16.2	18.4	18.7	+17.0
39.0	104	-35.4				-34.0	-31.5	-25.2	-17.2	-4.4	10.4	15.6	16.1	16.4	16.6	+17.0
40.0	103	-39.8			-34.0	-30.2	-25.1	-18.4	-6.0	-4.0	9.6	14.6	15.0	15.3	15.4	+17.0
41.0	112	-36.1				-33.8	-32.4	-27.1	-17.1	-8.7	11.4	16.2	21.0	24.3	24.7	+17.0
42.0	109	-33.8				-33.1	-31.8	-27.0	-14.1	-9.4	17.4	19.0	20.1	20.3	20.3	+17.0
43.0	104	-35.3			-34.0	-33.1	-31.2	-27.7	-14.2	-10.2	8.4	15.4	16.0	16.2	16.5	+17.0
44.0	106	-37.1				-33.1	-31.2	-27.7	-14.7	-16.7	6.1	11.7	12.0	12.4	12.7	+17.0
45.0	106	-40.4			-34.0	-37.1	-35.9	-29.1	-16.2	-14.7	4.7	9.0	10.2	12.4	12.7	+17.0
46.0	102	-50.0			-41.0	-39.8	-34.0	-28.9	-17.0	-17.0	5.2	6.7	7.0	7.2	7.3	+17.0
47.0	102	-41.8			-41.0	-40.1	-38.4	-34.0	-27.8	-17.5	6.1	3.0	5.0	16.0	16.4	+17.0
48.0	94	-47.4				-43.4	-40.4	-30.4	-18.4	-6.1	4.1	5.0	9.7	10.1	10.4	+17.0
49.0	95	-50.7				-44.4	-40.6	-37.5	-21.2	-7.4	0.6	2.0	7.4	8.4	8.5	+17.0
50.0	90	-50.5				-41.5	-39.7	-32.9	-22.1	-10.1	1.1	6.0	12.1	13.2	13.4	+17.0
51.0	83	-52.8				-41.1	-39.4	-32.9	-21.9	-10.2	-0.4	9.1	19.1	19.7	19.8	+17.0
52.0	80	-51.9				-44.6	-43.0	-35.7	-24.0	-9.7	-1.4	4.2	24.2	24.9	25.0	+17.0
53.0	74	-51.9				-49.1	-47.1	-37.1	-24.5	-12.3	-0.7	2.4	22.2	22.6	22.7	+17.0
54.0	64	-51.3				-50.7	-48.7	-39.6	-28.0	-14.7	-1.1	7.4	17.4	18.1	18.2	+17.0
55.0	60	-50.9					-49.6	-39.7	-28.4	-18.4	-9.0	8.4	12.2	12.5	12.5	+17.0
56.0	50	-54.5				-50.2	-49.7	-45.4	-20.5	-14.0	-8.2	3.0	6.1	6.5	6.6	+17.0
57.0	45	-57.0				-56.0	-55.7	-46.1	-31.1	-17.0	-4.2	-6.0	0.5	0.8	0.8	+17.0
58.0	30	-60.4					-58.0	-44.9	-31.5	-17.2	-5.2	-3.0	-3.5	-1.2	-1.2	+17.0
59.0	27	-62.4					-65.7	-50.7	-29.5	-17.5	-0.7	8.4	8.4	8.4	8.4	+17.0
60.0	20	-63.7					-94.0	-52.8	-30.0	-16.2	6.0	7.2	7.7	7.9	7.9	+17.0
61.0	13	-64.0						-54.0	-34.5	-16.1	4.4	4.0	5.0	5.1	5.1	+17.0
62.0	7	-65.1						-59.9	-52.5	-18.1	-14.1	-14.1	-14.0	-14.0	-14.0	+17.0
63.0	4	-67.2							-56.0	-18.5	-17.9	-17.7	-17.7	-17.6	-17.6	+17.0
64.0	2	-64.4							-64.0	-54.4	-53.2	-53.1	-53.1	-53.1	-53.1	+17.0
65.0	1	-44.7														+17.0
66.0	2	-44.8														+17.0
67.0	1	-64.3														+17.0
68.0	1	-61.9														+17.0
69.0	3	-70.1														+17.0
70.0	1	-112.6														+17.0
Positive is wind from the right (135°). Negative is wind from the left (315°).																
									-77.5	-52.4	-52.0	-51.0	-51.0	-51.8	-51.4	+17.0
									-54.5	-18.7	-18.5	-18.0	-18.0	-18.4	-18.4	+17.0
									-44.5	-15.2	-15.4	-15.4	-15.4	-15.4	-15.4	+17.0

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 5:3

DATA SOURCE										14 MARCH						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	26 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-10.0		-9.9	-8.9	-7.6	-6.3	-3.9	-0.5	+2.6	+4.7	+5.8	+6.7	+8.9	+11.0	
1.0	744	-24.0		-22.9	-17.2	-13.7	-11.9	-7.5	-0.9	+4.1	+7.3	+9.1	+10.7	+17.9	+19.0	
2.0	744	-28.0		-25.9	-22.2	-18.3	-15.4	-10.1	-3.9	+1.0	+4.6	+6.5	+7.7	+9.9	+11.0	
3.0	744	-36.0		-31.9	-24.8	-21.5	-18.7	-13.4	-6.4	-0.3	+2.8	+5.3	+7.3	+12.4	+13.0	
4.0	744	-42.0		-39.9	-28.8	-25.0	-22.4	-17.5	-8.6	-1.6	+1.5	+4.0	+5.8	+8.9	+11.0	
5.0	744	-44.0		-41.9	-33.3	-28.7	-26.4	-20.8	-11.0	-3.8	-0.2	+2.2	+3.8	+6.9	+10.0	
6.0	744	-47.0		-41.9	-37.2	-32.3	-28.6	-23.5	-13.8	-5.6	-1.3	+1.0	+2.7	+4.9	+10.0	
7.0	744	-51.0		-48.9	-42.7	-37.0	-33.3	-26.2	-16.3	-7.6	-2.3	-0.4	+1.5	+5.9	+9.0	
8.0	744	-50.0		-48.9	-44.7	-40.5	-36.6	-29.7	-18.9	-9.2	-3.6	-1.3	+0.8	+5.9	+9.0	
9.0	744	-67.0		-62.9	-52.7	-47.2	-42.1	-33.5	-21.3	-10.5	-3.9	-0.9	+2.1	+9.9	+20.0	
10.0	744	-99.0		-71.9	-58.5	-52.3	-46.9	-38.7	-24.1	-12.1	-5.1	-1.3	+5.5	+16.9	+19.0	
11.0	744	-75.0		-77.9	-65.7	-59.0	-53.2	-42.1	-26.6	-13.0	-6.0	-0.7	+4.5	+10.9	+19.0	
12.0	744	-76.0		-75.9	-69.2	-62.7	-57.2	-43.7	-28.6	-15.7	-8.5	-5.3	+0.8	+4.9	+9.0	
13.0	744	-74.0		-72.9	-62.7	-57.2	-51.3	-41.6	-29.3	-17.2	-11.2	-8.1	-5.1	+1.0	+4.0	
14.0	744	-67.0		-65.9	-58.2	-50.6	-45.8	-38.6	-27.0	-17.3	-11.8	-8.9	-6.3	+0.9	+2.0	
15.0	744	-57.0		-56.9	-48.8	-44.0	-40.2	-33.5	-23.5	-14.7	-10.5	-7.2	-3.2	+8.9	+10.0	
16.0	744	-48.0		-47.9	-41.7	-39.0	-36.4	-28.8	-20.0	-12.3	-8.1	-4.2	-1.7	+3.9	+16.0	
17.0	744	-52.0		-42.9	-34.9	-33.2	-29.7	-23.8	-15.6	-8.6	-5.0	-3.2	-1.1	+4.4	+5.0	
18.0	744	-51.0		-32.9	-28.2	-26.0	-23.4	-18.6	-11.1	-5.7	-2.1	-0.5	+1.5	+11.9	+15.0	
19.0	744	-31.0		-27.9	-23.1	-20.3	-17.1	-12.8	-7.1	-2.4	+0.3	+3.3	+5.8	+12.9	+14.0	
20.0	744	-24.0		-22.9	-20.2	-16.6	-13.2	-8.8	-4.1	-0.3	+2.9	+5.2	+8.3	+12.9	+15.0	
21.0	744	-21.0		-17.9	-14.7	-12.2	-9.7	-6.7	-2.3	+1.2	+4.8	+7.4	+10.3	+16.4	+17.0	
22.0	744	-26.0		-19.9	-14.2	-11.0	-8.6	-5.5	-1.0	+2.2	+5.1	+7.0	+10.7	+27.9	+29.0	
23.0	744	-20.0		-19.9	-11.7	-9.2	-7.7	-4.4	-0.5	+2.8	+5.7	+8.5	+12.2	+28.9	+35.0	
24.0	744	-27.0		-14.9	-10.5	-9.2	-7.4	-4.3	-0.6	+3.1	+7.5	+10.0	+12.8	+28.9	+31.0	
25.0	744	-20.0		-18.9	-14.8	-11.5	-8.4	-4.9	-0.7	+2.7	+7.5	+11.0	+15.5	+25.9	+31.0	
26.0	744	-25.0		-23.9	-15.5	-13.0	-9.2	-6.0	-1.3	+2.4	+7.4	+12.0	+17.2	+24.9	+30.0	
27.0	744	-26.0		-23.9	-16.3	-13.6	-10.9	-7.2	-1.7	+2.9	+8.6	+14.0	+21.1	+30.9	+33.0	
28.0	93	-14.6			-12.0	-11.2	-7.2	-1.3	3.4	5.4	7.0	7.5	8.1	9.1		
29.0	93	-17.4			-13.4	-12.2	-8.1	-2.5	3.1	6.4	7.4	9.1	9.7	9.4		
30.0	97	-20.1			-17.4	-15.1	-10.0	-4.4	2.4	5.4	6.0	7.0	7.5	7.4		
31.0	94	-21.9			-20.4	-17.1	-11.1	-5.0	0.7	4.4	5.0	6.0	7.0	7.1		
32.0	101	-24.0			-22.7	-20.0	-15.5	-8.4	0.6	5.4	6.4	7.0	7.0			
33.0	103	-26.9			-26.0	-23.4	-22.4	-19.1	-9.1	0.3	3.4	4.4	7.0	14.4	18.9	
34.0	103	-29.7			-29.0	-26.3	-25.9	-22.5	-9.4	-0.3	3.6	6.7	11.0	22.4	22.9	
35.0	102	-36.5			-33.0	-31.5	-30.2	-25.4	-10.1	-1.6	7.6	12.4	13.0	21.7	21.4	
36.0	102	-34.6			-32.0	-30.5	-28.2	-21.4	-0.8	-1.6	6.6	15.4	17.0	20.4	20.5	
37.0	113	-34.9			-29.0	-28.4	-25.1	-19.0	-10.1	-2.4	6.7	17.4	19.0	20.4	20.9	
38.0	113	-30.5				-25.4	-22.0	-10.4	-2.5	6.4	13.4	17.0	22.5	22.6		
39.0	114	-34.6			-33.0	-32.4	-27.1	-21.0	-12.4	-4.5	7.4	15.4	16.0	22.1	22.3	
40.0	114	-30.4				-27.6	-21.6	-11.5	-4.1	10.4	15.4	15.4	17.4	18.6	18.4	
41.0	114	-41.6			-32.0	-32.2	-30.6	-23.2	-11.4	-3.7	13.1	18.4	16.4	14.1	18.3	
42.0	114	-34.9			-32.4	-31.4	-30.1	-23.5	-14.2	-2.4	11.6	16.4	16.4	20.0	20.2	
43.0	114	-35.8			-34.0	-30.4	-29.3	-22.2	-14.0	-4.0	9.7	16.2	16.0	17.4	18.0	
44.0	113	-35.4			-31.0	-31.2	-28.4	-23.0	-11.4	-2.6	7.4	11.4	13.0	18.7	18.4	
45.0	111	-37.1			-33.0	-31.4	-28.7	-23.1	-12.0	-3.5	4.5	6.0	9.0	15.6	15.7	
46.0	110	-39.1			-34.0	-33.7	-30.5	-23.7	-11.3	-4.2	4.5	9.2	9.7	10.1	10.2	
47.0	108	-41.7				-35.4	-33.3	-23.4	-14.1	-5.5	1.4	7.4	10.0	14.5	14.6	
48.0	107	-40.5			-34.0	-33.5	-31.3	-23.5	-14.9	-4.0	-0.7	6.4	11.4	12.4	12.4	
49.0	106	-41.7			-39.0	-34.6	-30.7	-24.4	-16.4	-6.7	0.0	0.0	7.0	13.6	13.4	
50.0	102	-40.9			-34.0	-33.7	-29.0	-26.0	-17.7	-7.0	0.4	4.7	7.0	15.0	15.2	
51.0	97	-37.8				-34.4	-33.1	-28.4	-19.4	-4.1	-0.4			4.7	5.0	
52.0	94	-36.1				-34.0	-33.4	-30.0	-21.5	-10.0	-2.7	2.4	5.0	5.4	5.7	
53.0	87	-41.0				-40.0	-34.4	-31.2	-22.0	-15.5	-3.7	1.0	3.1	3.4	3.4	
54.0	80	-45.3				-38.7	-34.0	-31.6	-24.0	-15.1	-7.0	0.2	4.2	5.0	5.2	
55.0	64	-45.3				-41.4	-36.4	-33.4	-23.5	-13.5	-4.4	0.4	6.4	7.2	7.3	
56.0	50	-44.9				-42.4	-39.5	-33.0	-24.5	-13.4	-6.0	0.4	13.4	13.7	13.7	
57.0	51	-44.2				-39.4	-36.9	-36.9	-23.4	-14.1	-1.5	6.4	10.7	11.4	11.4	
58.0	41	-44.7					-39.9	-36.2	-24.5	-12.5	4.0	13.1	13.5	13.4	13.4	
59.0	32	-49.4					-39.4	-39.0	-27.3	-9.1	6.4	20.4	20.7	21.0	21.1	
60.0	22	-51.8					-49.0	-39.5	-24.0	-5.5	16.0	24.4	24.7	24.4	24.4	
61.0	14	-44.9						-32.4	-24.0	-4.1	30.4	30.7	30.4	30.9	31.0	
62.0	10	-40.0						-31.4	-24.0	9.4	21.4	21.4	21.7	21.4	21.4	
63.0	7	-50.5						-38.0	-26.5	-0.1	19.4	20.1	20.2	20.3	20.3	
64.0	5	-44.9						-31.5	1.2	1.4	2.0	2.0	2.1	2.1	2.1	
65.0	3	-30.3							-24.5	-3.4	-3.1	-3.4	-3.0	-2.9	-2.9	
66.0	2	-21.6							-24.0	-10.0	-9.7	-9.4	-9.4	-9.4	-9.4	
67.0	1	-17.9													-17.9	
68.0	1	-4.1													-3.1	
69.0	1	-4.6													3.6	
70.0	1	-2.9													-2.9	

Positive is wind from the right (135°).
Negative is wind from the left (315°).

DATA SOURCE										11 APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
57C	720	-11.0			-7.6	-6.3	-4.9	-2.6	+0.5	+3.4	+5.0	+5.8	+6.5	+10.0	+11.0	
1.0	720	-24.0			-15.8	-12.6	-10.2	-6.1	-0.1	+5.3	+8.3	+9.6	+11.2	+16.0	+17.0	
2.0	720	-26.0			-17.5	-14.9	-12.6	-8.5	-2.0	+2.8	+6.2	+7.8	+9.2	+12.0	+13.0	
3.0	720	-33.0			-20.6	-17.9	-16.4	-12.3	-4.2	+1.6	+5.1	+6.5	+7.7	+12.0	+13.0	
4.0	720	-38.0			-26.3	-21.7	-19.1	-14.1	-6.4	-0.0	+4.2	+5.7	+6.8	+8.0	+9.0	
5.0	720	-42.0			-28.5	-24.8	-22.0	-16.5	-8.4	-0.6	+3.0	+4.7	+6.9	+10.0	+11.0	
6.0	720	-45.0			-31.5	-28.7	-25.1	-19.5	-10.6	-1.7	+1.9	+4.7	+6.6	+9.0	+10.0	
7.0	720	-52.0			-37.7	-32.1	-28.0	-22.4	-12.7	-3.2	+0.5	+3.3	+7.9	+12.0	+13.0	
8.0	720	-60.0			-45.7	-36.9	-32.4	-25.5	-15.2	-4.7	-0.4	+1.7	+6.4	+11.5	+12.0	
9.0	720	-62.0			-51.6	-42.8	-36.4	-28.8	-17.0	-6.2	-0.4	+1.4	+5.4	+13.0	+14.0	
10.0	720	-78.0			-53.2	-47.3	-41.5	-32.9	-19.5	-7.9	-1.7	+0.1	+2.9	+13.0	+14.0	
11.0	720	-76.0			-60.3	-54.4	-47.3	-35.7	-22.4	-9.2	-2.8	+0.2	+2.7	+13.0	+14.0	
12.0	720	-75.0			-61.8	-56.5	-51.6	-39.5	-25.0	-11.0	-5.2	-1.6	+0.7	+8.0	+9.0	
13.0	720	-80.0			-65.3	-55.8	-50.0	-40.4	-26.6	-13.7	-6.6	-4.4	+0.5	+3.0	+4.0	
14.0	720	-66.0			-58.3	-52.4	-44.8	-36.3	-25.0	-14.3	-8.3	-5.3	-2.7	+0.9	+0.0	
15.0	720	-60.0			-48.2	-44.4	-39.0	-31.3	-21.5	-12.9	-7.2	-5.0	-3.3	-1.4	+1.0	
16.0	720	-53.0			-41.3	-37.7	-33.1	-26.3	-17.6	-10.4	-4.9	-3.2	-2.0	+2.0	+3.0	
17.0	720	-49.0			-31.9	-29.3	-26.5	-20.8	-13.2	-7.1	-2.7	-1.0	+0.8	+9.0	+10.0	
18.0	720	-35.0			-24.9	-22.3	-19.7	-14.5	-8.5	-3.5	-0.3	+0.9	+3.9	+8.0	+9.0	
19.0	720	-29.0			-19.9	-17.5	-14.1	-9.3	-4.1	-0.4	+1.6	+3.8	+5.4	+11.0	+12.0	
20.0	720	-26.0			-15.3	-12.6	-9.5	-6.0	-1.5	+1.3	+4.0	+5.6	+6.9	+13.0	+14.0	
21.0	720	-20.0			-10.5	-8.9	-7.4	-4.1	-0.5	+2.6	+4.7	+5.9	+7.8	+14.0	+15.0	
22.0	720	-19.0			-10.5	-7.6	-5.6	-2.8	+0.1	+3.5	+5.7	+7.2	+8.9	+11.5	+12.0	
23.0	720	-22.0			-9.3	-7.8	-5.5	-2.3	+0.7	+4.0	+6.2	+7.7	+9.9	+15.5	+16.0	
24.0	720	-11.0			-9.9	-7.5	-5.3	-2.3	+0.6	+4.4	+6.8	+8.4	+10.8	+16.0	+17.0	
25.0	720	-11.0			-8.7	-7.2	-5.4	-2.9	+0.1	+4.3	+7.1	+8.7	+11.6	+7.5	+18.0	
26.0	720	-12.0			-9.2	-7.4	-6.4	-3.8	-0.0	+4.9	+7.8	+9.8	+13.4	+18.0	+19.0	
27.0	720	-13.0			-10.7	-9.5	-8.0	-5.0	-0.4	+4.5	+8.9	+11.4	+13.9	+17.7	+18.0	
28.0	9A	-11.3			-8.4	-6.8	-5.2	-2.0	0.0	7.1	10.3	10.0	20.0	21.1	21.3	
29.0	9A	-14.8			-11.0	-10.0	-8.4	-6.4	-0.7	5.0	10.4	12.7	14.0	19.6	19.7	
30.0	10A	-15.8			-15.7	-14.4	-12.4	-9.1	-1.4	6.7	9.0	9.4	12.0	12.7	12.9	
31.0	10A	-20.5			-15.0	-14.3	-12.0	-10.5	-4.3	4.6	8.4	9.9	10.6	10.9	11.0	
32.0	10A	-21.2			-20.0	-14.8	-13.5	-10.6	-3.7	2.4	6.6	9.2	9.6	9.0	9.9	
33.0	10A	-21.6			-21.5	-20.5	-18.6	-12.7	-4.6	1.2	5.5	7.4	8.0	13.2	13.4	
34.0	11A	-29.0			-23.0	-21.7	-18.7	-17.0	-5.3	1.4	6.5	9.6	10.3	10.6	10.6	
35.0	11A	-34.6			-29.0	-21.7	-19.4	-15.3	-6.1	2.4	6.1	7.6	8.0	14.6	14.7	
36.0	11A	-29.0			-25.0	-25.2	-18.4	-13.7	-6.0	3.0	5.5	8.0	8.0	9.6	9.4	
37.0	11A	-37.5			-23.0	-21.4	-19.1	-13.7	-4.0	2.0	6.3	8.6	9.0	12.2	12.4	
38.0	11A	-24.7			-23.9	-21.5	-18.5	-13.1	-4.3	5.0	8.0	11.5	12.0	15.0	15.1	
39.0	11A	-27.6			-21.7	-19.5	-18.7	-13.7	-4.7	1.6	9.7	12.5	13.0	17.6	17.7	
40.0	11A	-20.5			-20.4	-17.7	-11.4	-5.9	-5.7	9.7	10.0	11.0	15.7	15.8		
41.0	11A	-20.5			-20.0	-19.5	-18.6	-12.2	-3.4	5.6	9.6	11.5	13.0	20.2	20.4	
42.0	11A	-22.1			-21.0	-21.5	-19.2	-13.1	-1.4	7.1	10.4	11.0	12.5	13.0	13.1	
43.0	11A	-29.0			-22.0	-22.2	-18.2	-13.7	-1.3	8.4	11.0	14.5	15.0	18.4	18.5	
44.0	11A	-23.7			-22.0	-20.5	-16.7	-11.6	-1.3	9.1	13.4	16.5	17.0	19.7	19.8	
45.0	10A	-23.9			-23.8	-21.8	-18.6	-12.0	-0.2	4.5	15.6	16.5	17.0	21.4	22.0	
46.0	10A	-29.7			-29.0	-25.6	-19.0	-14.2	-2.1	4.8	12.4	14.0	14.0	19.1	19.2	
47.0	10A	-31.3			-27.0	-24.7	-21.4	-15.4	-2.7	4.2	11.4	12.8	14.0	16.5	16.6	
48.0	10A	-31.7			-30.0	-28.7	-21.8	-15.0	-2.0	7.6	12.3	18.7	19.0	24.2	24.4	
49.0	10A	-33.0			-33.0	-28.7	-25.0	-18.1	-3.0	7.5	13.0	17.7	20.0	23.0	24.0	
50.0	10A	-32.5			-33.0	-28.7	-26.0	-13.6	-1.2	8.4	14.0	19.7	21.0	22.6	22.7	
51.0	9A	-30.3			-27.4	-26.4	-13.6	-7.0	0.2	17.1	18.4	20.4	20.7	20.8		
52.0	9A	-33.1			-26.0	-25.1	-13.5	-7.7	7.7	14.2	17.5	20.1	21.0	21.2		
53.0	8A	-30.6			-29.2	-26.5	-15.3	-5.5	6.6	11.0	13.9	15.2	16.0	16.2		
54.0	7A	-27.9			-25.6	-25.6	-10.1	-4.4	4.6	11.4	15.3	17.2	17.9	18.0		
55.0	6A	-35.6			-25.4	-24.4	-18.7	-4.2	6.0	12.0	14.6	20.4	21.0	21.1		
56.0	5A	-29.0			-25.4	-23.4	-19.4	-4.0	3.9	10.2	10.0	17.4	18.3	18.4		
57.0	4A	-42.4			-28.0	-25.7	-19.4	-10.7	2.2	8.7	6.0	14.5	14.9	15.0		
58.0	3A	-27.8				-22.6	-18.4	-8.2	3.8	10.3	14.2	14.4	14.4	14.4		
59.0	2A	-38.0				-23.7	-18.0	-7.8	10.0	11.5	11.0	12.1	12.2	12.2		
60.0	1A	-27.0				-18.8	-8.0	-4.0	14.0	17.2	17.2	17.6	17.7	17.7		
61.0	4A	-14.3				-11.7	-8.0	-2.7	23.6	23.6	23.0	24.0	24.1	24.1		
62.0	4A	-4.5					-7.0	-1.5	15.6	17.1	17.2	17.3	17.4	17.4		
63.0	4A	-17.3						-14.0	5.6	6.2	6.0	6.4	6.5	6.5		
64.0	2A	-11.4						-11.0	1.8	2.1	2.2	2.2	2.2	2.2		
65.0	2A	3.3						3.0	11.0	12.2	12.3	12.3	12.3	12.3		
66.0	2A	0.1						0.0	0.4	10.1	10.1	10.2	10.2	10.2		
67.0	2A	6.9						7.0	9.6	9.7	9.7	9.7	9.7	9.7		
68.0	2A	4.6						0.0	25.7	26.0	27.0	27.0	27.0	27.0		
69.0	2A	7.2						7.0	39.4	39.4	39.4	39.4	39.4	39.4		

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH TABLE 5.5

DATA SOURCE											MAY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM BBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	744	-9.0		-8.9	-6.1	-4.6	-2.9	-1.2	+0.7	+3.2	+4.7	+5.6	+6.3	+7.4	+8.0	
1.0	744	-15.0		-14.9	-10.3	-7.9	-6.4	-3.2	+0.4	+4.6	+7.1	+8.3	+8.8	+10.9	+13.0	
2.0	744	-15.0		-14.9	-12.1	-9.4	-7.4	-4.8	-0.7	+2.6	+5.4	+6.6	+7.9	+9.9	+12.0	
3.0	744	-22.0		-18.9	-14.1	-11.5	-9.2	-5.8	-1.0	+1.7	+4.4	+6.4	+8.0	+10.9	+12.0	
4.0	744	-23.0		-20.9	-16.8	-14.7	-11.7	-7.1	-1.7	+1.4	+4.4	+5.5	+6.5	+9.4	+10.0	
5.0	744	-26.0		-24.9	-20.1	-18.0	-13.3	-7.9	-2.9	+0.7	+3.7	+5.2	+6.7	+8.9	+10.0	
6.0	744	-28.0		-27.9	-21.7	-19.5	-15.8	-9.9	-4.3	+0.5	+3.4	+5.3	+7.1	+9.9	+12.0	
7.0	744	-27.0			-24.6	-21.2	-17.6	-11.8	-5.3	+0.1	+3.5	+5.3	+7.2	+12.9	+14.0	
8.0	744	-30.0			-27.6	-23.0	-19.7	-14.1	-6.3	-0.0	+3.9	+6.4	+8.1	+12.9	+14.0	
9.0	744	-33.0			-32.9	-29.1	-26.0	-22.8	-16.5	-7.7	+0.1	+3.9	+7.0	+9.7	+16.9	+21.0
10.0	744	-44.0			-43.9	-32.8	-30.2	-26.9	-18.5	-8.8	-0.3	+3.9	+7.3	+9.7	+19.9	+22.0
11.0	744	-47.0			-46.9	-40.2	-33.3	-29.6	-21.3	-11.0	-0.6	+4.6	+7.8	+10.2	+17.9	+25.0
12.0	744	-51.0			-50.9	-44.1	-38.6	-32.6	-23.8	-12.7	-2.0	+4.3	+8.3	+10.8	+12.9	+16.0
13.0	744	-51.0				-47.5	-42.0	-35.1	-26.1	-14.7	-4.0	+1.3	+4.8	+6.8	+12.9	+14.0
14.0	744	-48.0				-39.5	-37.2	-32.3	-24.7	-15.1	-5.7	-0.7	+1.5	+4.5	+8.9	+12.0
15.0	744	-38.0			-35.9	-31.5	-29.2	-26.6	-21.2	-13.4	-6.1	-2.0	-0.0	+2.1	+4.9	+7.0
16.0	744	-30.0			-29.9	-24.4	-23.4	-21.4	-17.4	-10.5	-4.2	-0.8	+1.0	+2.1	+3.9	+6.0
17.0	744	-28.0			-22.9	-20.5	-18.4	-16.1	-12.6	-6.9	-2.1	-0.1	+1.5	+3.1	+5.9	+9.0
18.0	744	-26.0			-17.9	-14.3	-13.2	-11.4	-8.4	-3.8	-0.2	+2.1	+3.6	+5.6	+10.9	+15.0
19.0	744	-21.0			-14.9	-9.7	-8.7	-7.6	-4.8	-0.8	+2.0	+3.9	+4.8	+5.9	+8.9	+12.0
20.0	744	-11.0			-10.9	-7.7	-6.4	-4.8	-2.5	+0.0	+3.2	+5.5	+6.6	+7.7	+10.4	+11.0
21.0	744	-7.0				-5.9	-4.3	-2.9	-0.9	+1.6	+4.9	+7.3	+8.5	+10.4	+12.9	+15.0
22.0	744	-13.0			-7.9	-4.3	-3.4	-2.2	-0.6	+2.4	+5.9	+8.5	+9.7	+11.7	+20.9	+22.0
23.0	744	-11.0			-4.9	-3.0	-2.4	-1.5	-0.2	+3.0	+6.7	+9.2	+10.7	+12.8	+16.9	+18.0
24.0	744	-7.0			-5.9	-3.9	-2.9	-1.7	-0.1	+3.6	+7.3	+10.0	+11.2	+12.7	+14.9	+16.0
25.0	744	-7.0				-5.7	-3.8	-2.1	-0.2	+3.5	+7.7	+10.5	+11.9	+13.1	+15.4	+16.0
26.0	744	-8.0				-5.9	-4.4	-2.7	-0.3	+3.7	+8.0	+10.7	+12.2	+13.6	+16.9	+18.0
27.0	744	-8.0				-6.7	-5.4	-3.6	-0.6	+3.2	+8.0	+11.5	+12.8	+14.9	+18.4	+19.0
28.0	103	-4.9				-8.9	-7.7	-4.0	-1.2	4.6	10.9	14.0	15.4	17.0	19.1	19.2
29.0	105	-14.8				-10.0	-8.4	-5.4	-1.7	3.8	10.4	16.3	17.3	18.0	20.8	21.0
30.0	105	-14.4				-12.0	-11.3	-6.5	-2.3	4.2	11.1	14.6	16.4	18.7	19.3	19.4
31.0	107	-16.2				-14.0	-13.6	-10.3	-3.7	3.5	9.5	12.9	14.6	15.0	17.6	17.7
32.0	110	-14.1				-13.0	-12.7	-10.7	-4.1	3.4	9.7	13.2	14.4	15.0	14.7	14.9
33.0	112	-16.3				-13.0	-12.7	-10.7	-4.1	3.4	9.9	12.2	13.7	15.0	19.0	20.1
34.0	113	-13.4				-10.0	-10.2	-8.4	-5.6	2.6	9.0	14.2	15.7	16.0	23.0	23.4
35.0	113	-12.0				-11.0	-11.2	-9.2	-6.1	2.6	10.3	13.9	15.7	16.0	20.5	20.6
36.0	113	-17.0				-12.0	-12.2	-8.4	-5.6	2.6	10.3	13.6	17.2	17.0	20.7	20.8
37.0	114	-12.0				-10.4	-9.5	-5.6	-5.6	3.0	11.5	15.7	16.6	17.0	21.1	21.3
38.0	112	-25.5				-13.9	-11.5	-8.7	-3.8	5.1	11.4	15.4	17.6	19.0	18.5	18.6
39.0	112	-14.8				-12.0	-11.8	-10.4	-2.2	5.3	11.4	16.9	18.4	19.0	19.4	19.5
40.0	115	-13.9				-13.8	-13.2	-8.2	0.2	5.0	12.6	18.1	20.8	21.0	21.8	21.9
41.0	116	-13.4				-12.8	-9.4	-6.6	1.1	7.5	13.5	18.6	20.8	21.8	24.1	24.3
42.0	116	-11.5				-9.8	-5.4	-4.3	2.4	8.7	14.7	19.1	21.7	24.8	26.3	26.5
43.0	113	-6.4					-1.7	-0.7	3.0	9.4	17.8	19.9	20.7	21.9	22.7	22.9
44.0	112	-14.1				-6.0	-4.7	-1.4	4.0	11.7	19.3	21.0	24.0	24.0	25.5	25.6
45.0	111	-7.8				-6.0	-3.5	-1.5	4.0	11.8	19.0	22.7	24.7	26.6	27.2	27.3
46.0	108	-12.7				-5.0	-3.6	-1.2	4.0	14.4	21.5	26.3	27.6	28.0	30.2	30.4
47.0	107	-14.8				-5.0	-4.3	0.3	6.8	14.6	21.4	25.4	27.4	29.0	31.7	31.8
48.0	106	-15.6				-5.0	-4.3	0.3	6.8	14.6	21.4	25.4	27.4	29.0	32.7	32.9
49.0	104	-12.7				-3.0	-2.5	-0.9	7.3	14.8	22.4	26.4	27.0	30.0	32.0	33.0
50.0	100	-7.8				-8.0	-0.7	3.0	8.2	16.0	24.7	29.0	31.8	32.0	34.6	34.6
51.0	98	-14.2					-0.9	0.9	8.4	15.3	25.1	30.0	30.0	34.0	34.7	34.8
52.0	95	-17.7					-2.8	-1.1	7.4	15.3	24.5	29.3	31.8	34.0	34.6	34.7
53.0	90	-23.5					-3.5	0.6	6.8	16.4	24.4	31.6	34.0	42.1	42.6	42.6
54.0	85	-7.1					-0.3	2.7	8.3	16.5	24.8	32.0	37.6	41.1	41.4	41.5
55.0	78	-12.4					-3.5	-0.6	6.2	16.0	27.4	34.7	39.7	39.2	39.5	39.6
56.0	66	-9.2					-1.7	0.2	6.0	16.3	27.0	35.2	39.7	40.2	40.6	40.6
57.0	57	-32.2					-19.8	6.4	17.5	29.2	34.0	34.0	34.6	34.9	34.9	34.9
58.0	43	-25.7					-10.7	3.2	17.5	25.4	32.7	33.1	33.3	33.4	33.5	33.5
59.0	33	-17.0					-19.0	-1.8	13.0	31.8	33.5	33.7	33.7	33.7	33.9	33.9
60.0	20	-14.4						2.0	9.0	33.1	36.5	36.0	37.1	37.2	37.2	37.2
61.0	12	0.1						7.0	14.8	24.6	34.4	35.0	35.4	35.5	35.5	35.5
62.0	9	3.1							6.0	31.7	31.9	31.0	31.0	32.0	32.0	32.0
63.0	2	6.1							9.0	24.0	27.2	27.3	27.3	27.3	27.3	27.3
64.0	2	0.1							12.0	22.5	22.5	22.5	22.5	22.7	22.7	22.7
65.0	2	12.0														11.4
66.0	1	11.4														21.4
67.0	1	21.4														24.0
68.0	1	24.0														24.0
69.0	1	34.7														34.7
70.0	1	37.5														37.5

Positive is wind from the right (135°).
Negative is wind from the left (315°).

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH TABLE 5.6

DATA SOURCE											JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA											
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											

EASTERN TEST RANGE
(CAPE KENNEDY, FLORIDA)

PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY
GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA

ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5F C	720	-7.0		-4.9	-3.6	-2.5	-0.9	+0.1	+2.9	+4.6	+5.6	+6.6	+7.7	+8.0		
1.0	720	-11.0		-9.2	-6.9	-5.0	-2.5	+0.3	+3.6	+5.7	+7.0	+8.0	+22.0	+23.0		
2.0	720	-18.0		-10.3	-7.7	-6.0	-3.8	-0.5	+2.3	+4.6	+6.0	+7.7	+22.0	+23.0		
3.0	720	-18.0		-11.2	-9.4	-7.2	-4.2	-0.7	+1.8	+4.5	+6.2	+8.2	+20.0	+21.0		
4.0	720	-16.0		-12.1	-10.5	-8.7	-4.9	-0.9	+1.5	+4.6	+5.9	+7.9	+20.0	+21.0		
5.0	720	-17.0		-11.8	-11.1	-9.5	-5.8	-1.3	+1.6	+4.3	+5.9	+7.9	+16.0	+17.0		
6.0	720	-16.0		-14.3	-11.6	-9.8	-6.3	-2.0	+1.3	+4.3	+6.5	+8.2	+18.0	+19.0		
7.0	720	-20.0		-14.2	-13.7	-11.5	-7.2	-2.3	+1.2	+4.3	+5.9	+7.7	+19.0	+20.0		
8.0	720	-23.0		-20.1	-16.5	-13.0	-8.0	-2.4	+1.4	+4.6	+6.9	+8.6	+18.0	+19.0		
9.0	720	-29.0		-23.8	-19.3	-14.8	-9.1	-3.3	+1.9	+5.3	+7.8	+9.6	+15.0	+16.0		
10.0	720	-36.0		-27.5	-22.8	-17.0	-10.7	-3.7	+2.5	+6.8	+9.1	+10.7	+15.0	+16.0		
11.0	720	-40.0		-29.9	-26.3	-20.0	-12.7	-4.0	+2.3	+7.8	+10.7	+12.4	+17.0	+18.0		
12.0	720	-39.0		-34.5	-31.1	-25.0	-14.7	-5.2	+1.6	+7.5	+10.6	+13.3	+18.0	+19.0		
13.0	720	-44.0		-38.3	-32.3	-27.5	-16.7	-7.0	+2.4	+6.8	+9.3	+12.9	+19.0	+20.0		
14.0	720	-46.0		-34.7	-29.7	-24.8	-16.8	-7.4	-0.1	+5.3	+8.2	+10.9	+18.0	+19.0		
15.0	720	-32.0		-27.9	-24.5	-21.2	-14.4	-5.9	-0.3	+4.1	+8.0	+9.9	+17.5	+18.0		
16.0	720	-22.0		-19.1	-16.9	-14.1	-9.2	-3.8	+0.5	+4.3	+6.3	+7.9	+18.0	+19.0		
17.0	720	-15.0		-11.4	-10.4	-8.1	-5.4	-1.1	+2.1	+5.2	+6.8	+7.8	+14.0	+15.0		
18.0	720	-9.0		-6.7	-5.8	-4.3	-2.0	+0.6	+4.0	+6.1	+7.7	+8.7	+13.0	+14.0		
19.0	720	-8.0		-3.7	-2.4	-1.1	-0.0	+2.9	+5.7	+8.1	+9.2	+10.1	+12.0	+13.0		
20.0	720	-10.0		-1.5	-0.8	-0.3	+1.4	+4.3	+7.5	+9.4	+10.7	+12.6	+17.0	+18.0		
21.0	720	-6.0		-1.3	-0.7	+0.0	+2.3	+5.6	+9.0	+11.2	+12.6	+14.2	+16.0	+17.0		
22.0	720	-8.0		-0.9	-0.4	+0.6	+3.1	+6.8	+10.3	+12.6	+13.5	+15.2	+16.6	+17.0		
23.0	720	-8.0		-1.2	+0.6	+1.7	+4.2	+7.7	+11.0	+13.0	+13.8	+15.5	+17.5	+18.0		
24.0	720	-7.0		-0.3	+0.6	+2.0	+4.5	+8.2	+11.6	+13.7	+14.8	+15.9	+17.9	+19.0		
25.0	720	-5.0		-0.2	+0.7	+2.2	+4.6	+8.5	+12.1	+14.5	+15.5	+16.7	+18.7	+20.0		
26.0	720	-2.0		+0.2	+0.9	+2.0	+4.6	+8.6	+12.6	+15.5	+16.7	+17.9	+20.0	+21.0		
27.0	720	-4.0		+0.9	+0.0	+1.5	+4.3	+8.8	+12.7	+16.0	+17.5	+18.3	+20.0	+21.0		
28.0	104	-0.7		-0.7	0.1	0.6	5.2	10.6	14.7	16.7	19.4	20.0	20.4	20.9		
29.0	104	-2.8		-2.0	-1.3	2.1	5.0	10.4	14.0	18.2	19.0	21.0	22.0	22.2		
30.0	107	-2.8		-2.0	-1.3	2.2	6.2	10.4	15.0	19.7	20.0	21.0	22.0	23.0		
31.0	104	0.0		0.1	1.2	3.1	5.7	11.1	15.7	20.5	21.6	22.0	22.5	26.0		
32.0	104	-2.8		-2.0	-1.3	3.1	6.4	11.4	15.1	19.2	20.5	21.0	22.0	27.5		
33.0	104	-1.4			0.5	2.7	5.7	11.2	15.1	19.5	20.0	22.0	26.0	26.2		
34.0	110	-6.4		-0.0	0.2	1.5	5.7	11.1	17.0	20.2	21.0	21.0	22.0	22.4		
35.0	111	-1.4			0.2	1.3	5.6	11.4	17.2	21.5	22.7	23.4	23.4	23.9		
36.0	111	-0.7			-0.5	2.3	7.2	13.4	18.5	23.5	24.5	25.0	28.1	28.3		
37.0	110	0.9			1.5	4.5	8.4	14.0	20.4	23.8	24.6	25.0	30.0	31.0		
38.0	110	2.3			3.5	5.2	9.7	15.0	22.3	24.8	26.5	28.0	32.0	32.2		
39.0	110	0.0			5.1	6.5	8.3	11.2	15.6	22.6	24.0	30.5	31.0	33.4		
40.0	110	4.9			6.0	6.5	8.5	12.4	16.5	23.1	27.2	28.0	30.0	30.4		
41.0	110	0.7			1.1	5.5	9.3	13.3	18.6	24.1	24.5	20.7	31.0	32.5		
42.0	104	7.1			7.1	7.7	10.2	13.4	19.7	25.0	29.5	32.0	35.5	36.0		
43.0	104	7.8			8.1	9.5	10.4	16.4	22.1	28.4	32.6	34.5	35.0	37.5		
44.0	104	13.4				13.4	13.0	17.4	23.5	31.0	34.5	36.5	37.0	38.0		
45.0	104	11.9				12.5	14.2	18.3	25.0	32.7	36.5	41.5	42.0	45.0		
46.0	104	9.1			13.1	14.2	15.5	19.8	28.0	34.2	39.4	43.5	47.0	50.5		
47.0	107	7.5			10.1	15.4	17.7	22.0	30.4	35.5	41.3	43.5	44.0	45.5		
48.0	101	7.6			14.0	15.3	19.0	23.4	32.5	37.5	43.0	45.7	47.0	48.4		
49.0	100	9.3			9.0	15.3	19.0	24.5	32.5	40.1	45.0	46.0	47.0	50.4		
50.0	92	12.0				15.1	16.8	23.0	32.5	40.5	46.1	47.0	52.1	52.0		
51.0	84	14.2				15.0	18.5	23.2	32.0	40.0	47.3	49.0	56.5	56.0		
52.0	80	12.7				14.4	16.3	22.3	33.0	42.3	47.0	54.0	56.1	56.7		
53.0	75	15.3					16.4	22.0	33.3	42.7	51.3	57.4	58.3	59.2		
54.0	73	4.5				13.3	16.2	23.8	33.2	41.5	48.4	51.7	56.2	56.5		
55.0	70	-4.6				12.5	15.3	24.1	34.2	41.5	46.4	48.0	56.2	56.5		
56.0	56	13.8				10.3	17.3	24.7	31.7	42.8	51.7	52.7	53.5	54.3		
57.0	62	-6.4				14.4	15.6	18.0	30.7	42.2	50.0	54.5	59.3	59.7		
58.0	52	-4.5				0.2	5.6	23.1	31.0	40.0	50.4	51.0	56.5	57.0		
59.0	40	-24.2					-5.0	15.7	32.0	41.2	45.0	48.1	48.0	49.4		
60.0	31	-5.8					17.2	22.0	31.5	41.5	48.5	56.0	56.0	56.5		
61.0	23	-6.8					1.2	14.5	30.5	40.4	50.0	50.0	61.1	61.2		
62.0	14	-6.4						8.2	23.0	57.4	63.3	63.4	63.0	63.0		
63.0	5	11.6							33.0	60.0	60.5	60.0	60.4	60.0		
64.0	2	32.6							33.0	34.8	39.1	39.2	39.2	39.2		
65.0	2	30.1							30.0	40.8	50.0	50.1	50.1	50.1		
66.0	1	27.3														
67.0	1	24.6														
68.0	1	22.0														

Positive is wind from the right (135°).
Negative is wind from the left (315°).

27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
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46.0
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48.0
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66.0
67.0
68.0

Positive is wind from the right (135°).
Negative is wind from the left (315°).

DATA SOURCE											JULY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5.0	744	-8.0		-6.9	-4.4	-2.9	-1.9	-0.8	+0.2	+2.7	+3.9	+4.9	+5.9	+7.4	+8.0	
1.0	744	-11.0			-9.3	-7.0	-5.5	-2.3	+0.3	+3.9	+6.7	+8.0	+10.5	+11.9	+13.0	
2.0	744	-12.0		-11.9	-8.5	-6.8	-5.4	-3.1	+0.4	+2.8	+6.3	+7.8	+9.2	+10.9	+17.0	
3.0	744	-12.0		-11.9	-9.3	-7.8	-6.2	-3.3	+0.5	+2.3	+5.4	+7.5	+8.6	+10.9	+12.0	
4.0	744	-13.0			-9.7	-8.7	-7.3	-3.7	+0.5	+2.7	+5.5	+7.4	+8.4	+9.9		
5.0	744	-14.0		-13.9	-11.2	-9.3	-7.2	-4.2	+0.5	+2.7	+5.7	+7.4	+8.1	+10.9	+12.0	
6.0	744	-17.0		-15.9	-11.7	-8.8	-7.3	-4.7	+0.5	+2.9	+5.8	+7.7	+9.1	+11.9	+21.0	
7.0	744	-16.0		-15.9	-10.8	-8.8	-7.1	-4.6	+0.4	+3.2	+6.4	+8.3	+9.6	+12.4	+13.0	
8.0	744	-15.0		-14.9	-10.8	-9.3	-7.3	-4.5	+0.6	+3.2	+6.7	+8.6	+11.2	+15.4	+16.0	
9.0	744	-17.0		-15.9	-10.9	-9.8	-7.8	-4.7	+0.7	+3.5	+7.8	+10.3	+13.3	+17.9	+22.0	
10.0	744	-14.0			-13.0	-10.8	-8.2	-5.4	+0.8	+3.4	+8.4	+11.6	+13.2	+21.9	+31.0	
11.0	744	-21.0		-18.9	-13.5	-11.1	-9.9	-6.3	+0.9	+3.7	+9.6	+13.3	+17.2	+30.9	+34.0	
12.0	744	-20.0			-15.5	-13.2	-11.2	-7.2	+1.1	+4.2	+10.9	+16.0	+20.8	+30.9	+34.0	
13.0	744	-20.0			-17.7	-15.2	-12.3	-8.7	+1.3	+4.9	+10.9	+17.3	+20.8	+30.9	+41.0	
14.0	744	-20.0		-18.9	-16.8	-14.6	-11.9	-7.7	+0.9	+4.3	+9.8	+14.5	+17.7	+26.9	+29.0	
15.0	744	-13.0		-12.9	-11.2	-9.6	-8.2	-4.9	+0.3	+4.1	+7.8	+10.4	+13.5	+19.9	+21.0	
16.0	744	-9.0		-8.9	-6.8	-5.8	-4.5	-2.0	+0.7	+4.3	+6.6	+8.0	+10.8	+11.9	+13.0	
17.0	744	-6.0			-4.5	-3.5	-2.3	-0.6	+2.1	+5.1	+7.0	+7.9	+9.1	+10.9	+12.0	
18.0	744	-3.0		-2.9	-1.8	-0.9	-0.4	+1.3	+3.9	+6.8	+8.8	+10.1	+11.7	+12.9	+14.0	
19.0	744	-0.0			+0.0	+0.8	+1.5	+3.3	+5.8	+8.4	+9.9	+10.9	+12.0	+14.9	+17.0	
20.0	744	-2.0		+0.9	+0.5	+1.4	+3.0	+6.7	+7.6	+10.4	+12.3	+13.3	+14.7	+17.9	+20.0	
21.0	744	+1.0			+1.5	+2.3	+3.5	+5.7	+9.1	+12.7	+15.1	+16.5	+17.6	+20.9	+25.0	
22.0	744	+15.0		+0.0	+3.0	+4.1	+5.1	+7.0	+10.2	+13.8	+16.4	+17.6	+18.6	+21.4	+22.0	
23.0	744	+0.0			+3.4	+4.7	+6.1	+8.0	+11.1	+14.5	+16.9	+18.1	+19.3	+21.9	+23.0	
24.0	744	-9.0		+1.0	+4.3	+6.0	+7.0	+8.8	+11.8	+15.1	+17.4	+18.5	+19.3	+22.9	+25.0	
25.0	744	+4.0			+4.1	+5.8	+7.0	+9.0	+12.2	+15.5	+18.1	+19.4	+21.1	+23.9	+25.0	
26.0	744	-5.0		+0.0	+3.5	+5.0	+6.5	+8.8	+12.5	+16.3	+19.3	+20.7	+22.1	+24.9	+28.0	
27.0	744	+1.0		-0.9	+3.4	+4.7	+6.3	+8.8	+12.6	+16.9	+19.6	+21.4	+23.1	+25.9	+29.0	
28.0	105	4.2			4.3	5.2	6.4	8.4	13.0	17.4	19.0	21.0	22.4	22.7	22.8	
29.0	104	7.5			7.5	7.7	8.8	10.5	14.8	18.5	20.0	21.4	22.5	22.7	22.7	
30.0	111	7.5			7.5	7.6	7.0	10.0	15.4	19.7	22.5	23.0	23.0	31.7	31.8	
31.0	112	6.4			6.4	7.2	8.2	11.2	15.0	20.2	22.7	23.0	24.0	28.2	28.4	
32.0	113	8.1				8.2	9.2	11.7	16.4	20.5	23.5	25.0	27.0	29.6	29.7	
33.0	117	-2.0			5.2	6.7	10.1	12.2	16.5	21.2	24.5	26.7	27.4	28.4	29.0	
34.0	121	7.1				7.4	9.0	12.0	17.2	22.5	25.7	27.2	28.4	30.9	31.1	
35.0	122	6.6			8.1	8.4	10.0	12.4	19.0	24.1	27.5	29.1	29.4	34.0	34.2	
36.0	122	6.4			7.2	9.4	10.5	14.5	20.4	24.4	27.0	28.2	30.4	31.9	32.1	
37.0	122	7.1			9.2	10.4	12.4	16.4	20.4	25.3	28.4	29.4	29.4	34.6	34.7	
38.0	124	-25.1			8.2	10.4	12.2	15.5	22.4	26.5	29.7	31.2	34.4	36.4	37.0	
39.0	125	1.2			6.3	10.4	14.1	17.0	24.0	28.4	31.2	32.2	35.4	35.9	36.0	
40.0	125	10.0			11.3	10.4	15.3	19.3	23.4	28.4	31.0	34.0	35.4	35.7	35.8	
41.0	125	7.8			9.3	10.4	14.1	18.6	25.0	30.1	33.0	36.1	36.4	37.3	37.4	
42.0	124	10.2			10.2	12.4	16.7	20.2	26.0	31.4	35.3	36.4	37.4	39.1	39.3	
43.0	124	11.9				12.4	15.7	20.9	28.3	32.4	34.4	40.4	42.4	45.0	45.3	
44.0	122	11.9			12.2	14.4	18.1	22.4	29.4	37.1	40.9	43.2	44.4	45.6	46.7	
45.0	121	16.2				18.0	23.4	33.1	40.4	45.5	47.2	48.4	49.4	52.0	53.0	
46.0	119	12.7			13.2	17.7	20.7	27.4	35.3	42.2	48.4	49.4	50.4	52.2	52.5	
47.0	118	10.6			13.1	13.4	21.0	28.0	36.4	44.1	49.4	50.4	51.4	57.0	58.1	
48.0	117	9.2			14.2	16.7	22.0	30.6	37.5	45.1	51.0	51.4	53.4	55.7	55.9	
49.0	115	12.0			15.2	19.4	24.4	33.2	39.1	46.9	51.1	53.2	53.0	57.0	57.2	
50.0	113	17.3			20.1	20.4	28.4	32.7	39.5	47.1	52.4	52.0	54.0	58.4	58.7	
51.0	110	19.0				19.3	22.3	32.7	39.6	47.5	53.5	56.2	57.0	59.4	59.7	
52.0	108	15.6				16.5	19.4	29.6	39.4	47.4	53.4	57.4	58.3	59.6	58.7	
53.0	103	15.6				16.3	18.3	28.2	39.6	48.4	54.0	58.4	60.5	60.0	61.0	
54.0	97	3.0				15.2	19.4	25.2	39.6	47.5	57.5	58.0	63.0	63.4	63.5	
55.0	89	-4.9				12.0	16.2	25.1	39.4	48.4	56.4	60.4	63.1	63.6	63.6	
56.0	84	-5.0				-3.1	12.2	22.4	39.4	48.3	52.4	60.4	60.5	60.4	60.4	
57.0	77	-7.1				2.4	7.9	23.7	39.4	48.7	55.2	57.2	60.2	60.7	60.8	
58.0	56	-14.8				6.5	14.3	22.5	37.4	47.5	55.7	61.4	61.0	62.2	62.3	
59.0	56	2.7				4.3	7.4	17.0	34.0	49.1	55.2	60.0	60.4	61.1	61.2	
60.0	41	-21.3				6.1	14.5	37.5	49.7	61.5	63.1	63.5	63.5	63.7	63.4	
61.0	24	-51.9				7.3	25.0	46.5	55.0	62.4	63.4	63.4	63.4	63.6	63.6	
62.0	14	-23.5					24.0	44.0	52.1	61.1	61.4	61.4	61.4	61.5	61.5	
63.0	11	23.5					41.7	47.3	52.5	54.3	54.4	54.4	54.4	54.4	54.7	
64.0	9	12.3					22.4	44.5	51.6	57.5	57.7	57.4	57.4	57.9	57.9	
65.0	9	21.1					24.4	37.4	45.4	60.7	60.0	61.1	61.2	61.2	61.2	
66.0	5	15.1						29.5	60.2	60.4	60.7	60.4	60.4	60.4	60.4	
67.0	4	25.7						50.0	54.3	54.4	54.7	54.4	54.4	54.4	54.4	
68.0	5	4.0						25.5	47.2	47.4	47.4	47.4	47.4	47.4	47.4	
69.0	5	-0.4						17.5	40.2	40.7	40.4	40.4	40.4	40.4	40.4	
70.0	5	13.1						21.5	29.2	24.4	24.7	24.7	24.7	24.4	24.4	
Positive is wind from the right (135°). Negative is wind from the left (315°).																

Positive is wind from the right (135°).
Negative is wind from the left (315°).

DATA SOURCE										AUGUST									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)												
				LATITUDE	LONGITUDE														
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967													
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967													
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																			
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)			
5F C	744	-8.0	-5.9	-4.3	-3.3	-2.5	-2.0	-0.9	-0.1	+1.7	+3.3	+3.9	+4.7	+5.9	+8.0				
1.0	744	-10.0	-9.9	-8.1	-6.5	-5.1	-4.3	-2.7	-0.2	+3.6	+5.7	+7.0	+8.7	+11.9	+17.0				
2.0	744	-10.0	-9.9	-8.1	-6.5	-5.1	-4.3	-2.7	-0.3	+2.7	+4.9	+6.2	+6.9	+12.9	+19.0				
3.0	744	-10.0	-9.9	-8.1	-6.3	-5.2	-3.1	-0.4	+2.8	+4.8	+6.4	+7.7	+7.7	+11.9	+20.0				
4.0	744	-9.0	-7.6	-6.6	-5.4	-4.3	-3.3	-0.4	+2.7	+5.3	+7.0	+8.3	+10.9	+19.0					
5.0	744	-11.0	-9.9	-8.4	-7.0	-5.9	-4.8	-0.5	+2.8	+5.8	+7.3	+8.6	+16.9	+19.0					
6.0	744	-13.0	-11.9	-8.7	-7.7	-6.2	-5.7	-0.5	+2.8	+5.5	+7.0	+8.3	+13.9	+17.0					
7.0	744	-14.0	-11.9	-9.3	-7.5	-6.1	-4.0	-0.5	+2.9	+5.9	+7.2	+8.7	+11.9	+14.0					
8.0	744	-14.0	-12.9	-10.8	-9.1	-6.9	-4.3	-0.6	+3.2	+5.6	+7.5	+9.5	+11.9	+18.0					
9.0	744	-15.0	-13.9	-11.3	-10.0	-7.2	-4.6	-0.6	+3.3	+6.0	+7.8	+9.6	+12.9	+18.0					
10.0	744	-17.0	-15.9	-11.7	-9.8	-8.6	-5.7	-0.9	+3.8	+6.9	+8.8	+10.8	+13.9	+17.0					
11.0	744	-18.0	-13.9	-12.4	-11.8	-8.9	-6.4	-0.9	+4.4	+8.7	+10.5	+11.6	+18.9	+20.0					
12.0	744	-17.0	-15.2	-14.0	-11.8	-7.5	-5.1	-2.0	+4.6	+10.3	+12.6	+14.7	+20.9	+22.0					
13.0	744	-20.0	-14.5	-14.8	-12.6	-8.4	-4.4	-1.2	+4.1	+9.8	+12.7	+16.1	+20.4	+21.0					
14.0	744	-18.0	-15.1	-12.5	-10.7	-7.4	-4.7	-1.5	+3.5	+7.4	+10.6	+12.1	+15.9	+25.0					
15.0	744	-13.0	-9.5	-8.3	-7.1	-4.7	-0.6	+3.6	+6.7	+8.2	+9.5	+15.4	+16.0						
16.0	744	-9.0	-6.8	-5.8	-4.7	-1.7	-0.5	+3.8	+5.7	+6.8	+7.7	+10.4	+11.0						
17.0	744	-5.0	-3.7	-3.0	-1.9	-0.4	-0.4	+2.3	+5.1	+6.9	+8.6	+9.7	+11.9	+17.0					
18.0	744	+0.0	-3.9	-1.6	-0.8	-0.4	-1.1	+4.2	+7.0	+8.6	+9.6	+10.7	+13.9	+16.0					
19.0	744	+4.0	+1.0	+1.7	+3.4	+5.9	+8.5	+10.4	+11.5	+12.7	+14.9	+16.9	+18.0						
20.0	744	+0.0	+0.4	+1.5	+3.2	+5.1	+7.9	+10.6	+12.6	+13.6	+14.6	+17.4	+18.0						
21.0	744	+0.0	+2.3	+3.3	+4.2	+5.1	+7.9	+10.6	+12.2	+14.5	+15.5	+16.4	+18.9	+21.0					
22.0	744	+0.0	+2.0	+4.1	+5.2	+7.1	+10.3	+13.6	+15.5	+16.7	+17.7	+20.9	+27.0						
23.0	744	+1.0	+3.8	+5.2	+6.3	+8.1	+11.1	+14.2	+16.4	+17.5	+18.3	+20.9	+28.0						
24.0	744	+3.0	+4.3	+5.6	+6.7	+8.6	+11.6	+14.9	+16.8	+18.0	+18.8	+23.9	+28.0						
25.0	744	+4.0	+4.4	+5.7	+6.9	+8.8	+12.0	+15.6	+17.9	+19.3	+20.5	+21.9	+25.0						
26.0	744	+5.0	+4.1	+5.5	+6.5	+8.8	+12.1	+15.8	+18.5	+20.3	+21.3	+22.9	+24.0						
27.0	744	+3.0	+4.5	+6.0	+7.0	+8.7	+12.1	+16.4	+19.0	+20.6	+21.8	+29.4	+30.0						
28.0	110	4.9	5.1	6.3	7.4	10.0	13.9	16.0	20.3	21.6	22.0	22.3	22.4						
29.0	113	7.5	4.1	6.2	7.7	11.0	14.4	17.0	21.7	23.0	24.6	25.3	25.4						
30.0	113	9.0	7.1	7.4	8.4	11.3	15.5	19.3	21.1	22.0	25.0	26.6	26.7						
31.0	115	7.1	7.1	7.6	8.4	12.1	15.7	21.0	23.1	23.0	24.9	27.4	27.5						
32.0	115	7.2	7.2	7.5	9.4	10.0	15.0	20.9	28.3	25.0	25.0	40.1	40.3						
33.0	115	6.4	7.3	7.3	8.9	12.1	15.4	20.6	23.1	24.0	25.0	33.0	33.9						
34.0	117	2.1	7.2	8.7	10.0	11.0	15.4	21.0	26.0	26.0	36.4	37.4	37.5						
35.0	114	-0.7	-0.6	2.7	7.0	11.3	16.0	23.3	25.4	24.7	29.4	30.3	30.4						
36.0	114	-12.1	-1.8	3.7	6.9	11.0	17.5	23.6	27.4	27.0	29.4	32.7	32.9						
37.0	120	-2.6	3.2	5.7	7.5	11.3	18.3	23.3	28.5	29.0	30.4	31.4	31.5						
38.0	120	-16.4	2.2	3.7	6.0	12.0	19.0	25.2	29.4	30.4	30.7	30.9	31.0						
39.0	120	0.0	0.2	2.7	7.5	12.4	19.5	25.4	29.4	32.0	32.0	34.0	34.2						
40.0	113	4.2	4.2	5.7	7.0	12.0	19.0	24.4	32.3	33.1	33.0	40.7	40.4						
41.0	117	7.8	4.2	5.7	7.0	12.4	19.0	24.4	32.3	33.2	33.0	35.4	36.1						
42.0	117	-2.5	4.2	5.7	7.0	12.4	19.0	24.4	32.3	33.2	33.0	35.4	36.1						
43.0	117	4.2	7.3	10.3	16.1	23.0	29.1	34.2	37.3	38.4	41.6	41.6	41.7						
44.0	115	-3.5	2.2	4.4	9.3	16.0	25.2	32.0	36.3	39.4	39.0	40.2	40.3						
45.0	114	3.9	5.1	6.4	8.9	16.0	26.2	35.5	39.3	43.0	46.0	50.0	50.2						
46.0	113	2.8	4.7	6.4	8.7	17.0	26.4	36.2	40.7	40.0	52.0	53.4	53.9						
47.0	110	5.4	5.4	5.4	8.2	16.5	28.0	36.5	46.5	48.0	55.0	59.3	59.5						
48.0	110	-2.1	6.1	9.3	10.5	18.1	27.3	37.1	41.5	47.2	49.0	54.2	54.4						
49.0	104	1.0	3.1	5.2	7.2	16.4	24.5	36.4	41.0	43.0	46.0	53.4	53.5						
50.0	105	-0.9	1.1	7.2	12.1	16.4	26.2	36.4	43.4	47.4	49.0	53.4	53.7						
51.0	105	-3.5	0.4	11.3	15.9	26.5	36.4	47.4	51.4	51.4	53.0	54.4	54.6						
52.0	94	-5.6	-3.5	7.2	11.0	15.1	25.5	39.2	48.1	51.4	57.0	57.0	59.0						
53.0	96	-2.7	5.2	10.4	13.4	24.0	35.4	42.4	44.4	44.0	70.0	71.0	71.1						
54.0	91	-4.5	-2.0	4.3	12.0	24.2	33.5	41.5	42.0	42.0	86.1	86.0	87.1						
55.0	83	-16.5	-11.6	-3.9	11.0	23.4	33.0	38.4	43.4	43.4	91.1	91.6	91.6						
56.0	75	-14.4	-9.4	-6.2	3.0	21.4	32.1	45.3	48.4	48.4	63.4	64.2	64.4						
57.0	51	-14.1	-17.4	-6.9	0.0	17.0	36.2	44.0	49.4	49.4	54.0	54.0	55.0						
58.0	44	-21.2	-6.4	-0.4	-0.4	15.0	38.4	55.4	56.0	54.4	54.4	54.4	54.4						
59.0	37	-24.7	-23.1	-4.1	-4.1	15.4	38.1	54.1	54.1	54.1	55.1	55.1	55.1						
60.0	27	-29.8	-23.6	-1.7	-1.7	22.4	30.7	53.7	54.4	54.4	55.1	55.1	55.1						
61.0	27	-27.1	-20.4	-4.7	-4.7	18.4	32.7	61.7	65.4	66.1	66.4	66.4	66.4						
62.0	10	-15.0	-1.0	15.4	29.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0						
63.0	16	-7.7	-6.5	14.0	30.5	49.1	49.0	49.0	49.0	49.0	49.4	49.7	49.7						
64.0	10	-12.0	-5.4	17.0	38.4	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3						
65.0	8	-5.7	6.3	13.0	27.7	29.7	30.0	30.1	30.1	30.1	30.1	30.2	30.2						
66.0	7	6.4	6.4	10.5	35.0	41.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0						
67.0	6	6.8	14.0	38.0	38.4	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0						
68.0	5	7.1	9.5	20.2	24.4	24.0	25.0	25.0	25.0	25.0	25.0	25.1	25.1						
69.0	4	12.9	15.0	21.3	21.7	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0						
70.0	4	0.0	12.0	24.4	24.4	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0						

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH TABLE 5.9

DATA SOURCE										SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED
5FC	720	-10.0			-5.9	-4.4	-2.7	-1.3	+0.0	+2.2	+3.7	+4.5	+5.6	+9.0	+10.0	
1.0	720	-32.0			-10.3	-7.9	-6.0	-2.2	+0.8	+4.9	+7.3	+8.7	+10.6	+31.0	+32.0	
2.0	720	-31.0			-10.3	-8.2	-6.3	-3.1	+0.1	+3.9	+6.8	+8.5	+11.4	+34.0	+35.0	
3.0	720	-30.0			-10.9	-8.6	-6.6	-3.7	+0.4	+3.4	+6.5	+8.1	+10.4	+34.0	+35.0	
4.0	720	-26.0			-10.2	-8.4	-6.8	-4.3	+0.5	+2.8	+6.1	+7.8	+10.4	+30.0	+31.0	
5.0	720	-25.0			-9.9	-8.9	-7.6	-4.7	+0.7	+3.0	+6.1	+7.7	+9.9	+25.0	+26.0	
6.0	720	-24.0			-10.9	-9.3	-8.1	-5.3	+0.9	+2.6	+6.2	+7.8	+11.9	+26.0	+27.0	
7.0	720	-21.0			-12.8	-10.6	-8.3	-5.4	+1.1	+2.6	+6.3	+8.5	+12.4	+28.0	+29.0	
8.0	720	-18.0			-13.5	-11.2	-9.0	-6.2	+1.4	+2.1	+5.9	+8.3	+11.8	+27.0	+28.0	
9.0	720	-18.0			-15.5	-13.3	-11.0	-7.5	+2.0	+1.8	+5.2	+7.9	+13.4	+18.6	+19.0	
10.0	720	-24.0			-17.7	-15.8	-13.4	-8.8	+3.1	+1.8	+5.9	+8.6	+11.9	+24.0	+25.0	
11.0	720	-27.0			-20.9	-19.2	-15.6	-11.3	+3.5	+1.6	+6.0	+9.5	+14.8	+23.0	+24.0	
12.0	720	-31.0			-25.1	-23.3	-20.1	-13.0	+4.5	+1.5	+6.0	+10.2	+14.8	+23.0	+24.0	
13.0	720	-36.0			-29.7	-25.3	-22.0	-14.2	+4.8	+1.3	+6.7	+10.5	+12.4	+24.0	+25.0	
14.0	720	-38.0			-24.9	-24.8	-19.9	-12.7	+4.9	+1.0	+7.1	+11.1	+15.8	+27.0	+28.0	
15.0	720	-24.0			-18.9	-17.1	-14.7	-9.9	+3.6	+1.9	+6.5	+10.8	+16.4	+30.0	+31.0	
16.0	720	-15.0			-12.5	-10.9	-8.9	-6.1	+1.8	+2.6	+5.8	+9.0	+10.4	+17.0	+18.0	
17.0	720	-12.0			-9.2	-7.7	-6.5	-3.5	+0.2	+3.5	+6.3	+8.4	+11.2	+13.5	+14.0	
18.0	720	-9.0			-6.4	-4.6	-3.5	-1.2	+1.2	+4.6	+6.9	+8.5	+9.9	+12.5	+13.0	
19.0	720	-6.0			-4.1	-2.6	-1.3	-0.1	+2.8	+6.0	+8.0	+8.9	+10.2	+12.5	+13.0	
20.0	720	-4.0			-1.9	-0.9	-0.4	+1.3	+4.3	+7.4	+9.5	+10.5	+11.5	+19.0	+20.0	
21.0	720	-4.0			-0.7	-0.2	+1.0	+2.8	+5.5	+8.7	+10.8	+12.2	+13.5	+18.0	+19.0	
22.0	720	-1.0			-0.3	+0.5	+1.6	+3.5	+6.4	+9.5	+11.7	+13.1	+15.1	+17.0	+18.0	
23.0	720	-1.0			-0.5	+1.0	+1.9	+4.1	+7.2	+10.2	+12.2	+12.9	+13.9	+15.5	+16.0	
24.0	720	-2.0			-0.1	+1.1	+2.1	+4.2	+7.3	+10.4	+12.4	+13.5	+15.3	+18.0	+19.0	
25.0	720	-10.0			+0.0	+1.2	+2.3	+4.3	+7.5	+11.1	+13.9	+14.9	+16.2	+19.0	+20.0	
26.0	720	-0.0			+0.1	+1.0	+2.1	+3.8	+7.4	+11.2	+14.2	+16.2	+17.4	+18.6	+19.0	
27.0	720	-10.0			+1.2	-0.4	+1.0	+3.7	+7.3	+11.7	+14.6	+16.7	+18.4	+26.0	+27.0	
28.0	105	0.0			0.0	0.5	3.0	4.7	8.0	12.2	13.4	15.4	17.0	19.4	20.0	
29.0	107	0.6			-1.8	1.4	2.4	4.6	8.2	11.5	15.7	20.3	21.0	21.7	21.4	
30.0	108	-2.6			-2.5	-1.8	0.4	3.8	7.7	12.4	15.0	19.5	20.0	22.7	22.4	
31.0	109	-7.1			-4.0	-0.5	1.7	3.8	8.0	13.0	15.4	19.4	19.0	22.0	22.4	
32.0	108	-10.8			-5.0	-1.5	0.5	3.4	8.5	13.0	15.4	19.4	19.0	22.0	22.4	
33.0	109	-5.2			-2.5	0.5	0.5	4.0	7.4	13.1	15.4	17.0	19.4	20.4	20.5	
34.0	109	-6.4			-4.4	-1.6	1.6	6.7	12.0	17.4	19.4	19.0	20.4	20.4	20.5	
35.0	104	-15.5			-0.0	-6.5	-3.3	0.0	6.4	13.3	16.6	18.4	19.0	20.0	20.2	
36.0	104	-13.5			-6.0	-5.5	-3.9	-0.4	5.6	13.3	17.4	18.4	22.0	24.4	24.0	
37.0	107	-13.4			-0.0	-7.6	-3.7	0.3	6.4	12.7	17.4	20.0	24.4	25.1	25.2	
38.0	106	-9.8			-0.0	-8.3	-4.7	0.6	6.4	12.6	17.4	19.0	20.0	25.4	26.0	
39.0	106	-12.1			-11.0	-8.4	-7.3	0.0	7.4	13.7	17.7	20.4	22.4	23.2	23.3	
40.0	106	-13.4			-0.0	-8.3	-2.0	0.2	6.3	15.2	19.7	22.4	23.0	24.4	24.7	
41.0	102	-10.3			-10.0	-8.4	-5.0	0.5	5.5	14.4	21.0	23.7	25.0	30.5	30.5	
42.0	102	-0.9			-0.0	-8.6	-7.4	-0.6	5.1	15.4	22.0	24.7	30.0	32.5	32.5	
43.0	100	-10.6			-11.0	-8.0	-6.0	-1.0	6.7	17.6	25.0	26.0	24.0	35.0	35.3	
44.0	99	-0.2			-7.0	-1.1	-7.0	-1.1	7.4	14.1	24.4	28.4	33.0	33.4	33.0	
45.0	95	-10.6			-8.4	-6.7	-1.7	5.7	16.6	23.6	30.0	36.0	36.0	36.4	36.4	
46.0	94	-13.9			-8.4	-6.3	0.0	6.4	15.0	21.3	27.0	38.1	38.1	38.4	38.4	
47.0	86	-15.3			-8.5	-6.4	1.1	7.1	17.4	22.6	26.0	28.1	28.1	24.7	24.4	
48.0	85	-7.8			-7.5	-5.7	+0.4	6.3	17.5	22.6	26.4	28.1	28.1	24.0	24.0	
49.0	83	-10.6			-0.1	-5.0	-0.4	7.4	17.0	21.4	26.1	28.0	28.0	29.1	29.1	
50.0	81	-11.3			-9.2	-7.0	-1.0	5.4	16.1	23.0	29.0	32.0	32.0	32.4	32.4	
51.0	76	-12.9			-11.3	-8.2	-2.0	6.3	15.0	23.1	28.4	36.2	36.2	36.7	36.4	
52.0	66	-21.5			-8.5	-4.0	-1.6	6.0	20.5	25.7	29.4	31.3	31.4	31.9	31.9	
53.0	61	-23.4			-11.4	-7.0	-0.4	4.2	10.4	26.5	26.0	30.2	30.2	30.5	30.5	
54.0	58	-21.3			-16.7	-10.1	-0.0	4.7	18.0	24.6	26.7	27.5	24.2	24.3	24.3	
55.0	56	-19.8			-17.7	-15.2	-7.4	2.4	15.6	23.3	24.7	30.5	31.0	31.1	31.1	
56.0	46	-19.8			-16.0	-13.7	-5.0	2.0	14.7	20.7	23.0	24.3	24.3	24.5	24.5	
57.0	37	-24.6			-15.1	-8.1	1.4	1.8	12.1	17.6	20.1	29.6	29.6	29.9	29.9	
58.0	31	-32.2			-26.4	-12.5	-1.2	1.3	13.1	23.5	27.4	27.7	28.0	28.0	28.0	
59.0	20	-21.9			-22.0	-9.4	1.5	11.4	14.0	25.4	25.4	25.4	25.4	25.0	25.0	
60.0	12	-33.2			-20.1	-20.1	-2.0	8.1	13.5	13.0	14.0	14.0	14.1	14.1	14.1	
61.0	4	-48.1			-11.7	0.3	7.7	0.3	7.7	8.7	0.0	9.1	0.2	9.2	9.2	
62.0	6	-72.1			-14.0	0.5	14.0	0.5	14.0	14.6	14.7	14.4	14.4	14.4	14.4	
63.0	6	-96.2			-12.0	-4.0	12.0	-4.0	12.0	12.5	12.6	12.7	12.7	12.7	12.7	
64.0	2	-5.8			-16.0	-13.7	-5.0	2.0	14.7	20.7	23.0	24.3	24.3	24.5	24.5	
65.0	1	-47.1			-15.1	-8.1	1.4	1.8	12.1	17.6	20.1	29.6	29.6	29.9	29.9	
66.0	1	-61.0			-26.4	-12.5	-1.2	1.3	13.1	23.5	27.4	27.7	28.0	28.0	28.0	
67.0	1	-43.5			-22.0	-9.4	1.5	11.4	14.0	25.4	25.4	25.4	25.4	25.0	25.0	
68.0	1	-32.8			-20.1	-20.1	-2.0	8.1	13.5	13.0	14.0	14.0	14.1	14.1	14.1	
69.0	1	-19.4			-11.7	0.3	7.7	0.3	7.7	8.7	0.0	9.1	0.2	9.2	9.2	
70.0	1	-1.8			-14.0	0.5	14.0	0.5	14.0	14.6	14.7	14.4	14.4	14.4	14.4	
									-4.0	12.0	12.5	12.6	12.7	12.7	12.7	
									-6.0	17.5	17.6	17.6	17.7	17.7	17.7	
														-47.1	-47.1	
														-61.0	-61.0	
														-43.5	-43.5	
														-32.8	-32.8	
														-19.4	-19.4	
														-1.8	-1.8	

Positive is wind from the right (135°).
Negative is wind from the left (315°).

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH TABLE 5.10

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-10.0		-9.9	-7.8	-7.0	-4.9	-2.9	-0.6	+1.7	+3.4	+9.3	+5.3	+7.9	+9.0	
1.0	744	-14.0		-15.9	-11.9	-9.7	-7.7	-4.5	-0.2	+3.4	+7.0	+9.6	+10.1	+12.9	+14.0	
2.0	744	-14.0			-12.6	-10.8	-9.2	-5.2	-1.0	+2.6	+5.6	+7.6	+10.0	+11.4	+12.0	
3.0	744	-18.0			-14.2	-12.6	-10.5	-6.6	-1.5	+1.9	+4.6	+6.6	+8.7	+12.6	+13.0	
4.0	744	-22.0			-16.8	-14.5	-11.5	-7.7	-2.7	+1.3	+4.9	+6.5	+7.8	+10.4	+11.0	
5.0	744	-23.0			-19.3	-15.7	-13.3	-9.5	-3.8	+0.3	+3.7	+5.2	+6.4	+8.9	+10.0	
6.0	744	-23.0			-21.2	-19.5	-16.4	-10.9	-4.8	-0.0	+3.3	+4.7	+5.8	+8.4	+9.0	
7.0	744	-29.0			-27.9	-25.8	-22.8	-20.2	-13.1	-6.2	-0.2	+2.9	+4.7	+6.1	+9.9	+11.0
8.0	744	-32.0				-28.5	-26.0	-23.4	-16.0	-7.9	-0.5	+2.8	+4.5	+6.1	+11.9	+17.0
9.0	744	-39.0				-37.9	-35.1	-30.0	-24.4	-19.2	-9.3	+3.8	+6.2	+7.9	+10.4	+11.0
10.0	744	-46.0				-42.9	-37.2	-33.5	-30.3	-24.4	-10.7	-0.5	+5.4	+8.5	+11.7	+15.9
11.0	744	-57.0				-51.9	-43.1	-37.3	-34.5	-24.8	-12.5	-0.4	+6.1	+10.5	+13.1	+19.9
12.0	744	-60.0				-59.9	-44.2	-40.6	-34.5	-26.3	-14.1	-1.4	+4.8	+9.3	+13.2	+19.9
13.0	744	-55.0				-53.9	-45.7	-40.5	-35.1	-25.6	-14.4	-3.2	+3.4	+6.8	+8.0	+13.9
14.0	744	-54.0				-53.9	-45.5	-34.6	-31.1	-23.2	-13.5	-3.8	+0.2	+3.6	+7.1	+10.9
15.0	744	-49.0				-40.9	-34.7	-30.0	-25.9	-19.8	-11.0	-3.5	+0.4	+2.5	+4.8	+7.9
16.0	744	-34.0				-32.9	-25.8	-23.3	-19.9	-14.3	-8.0	-2.0	+0.7	+1.9	+4.5	+6.9
17.0	744	-26.0				-22.9	-18.6	-16.5	-13.8	-10.1	-4.7	-0.4	+2.2	+3.4	+4.9	+6.6
18.0	744	-22.0				-20.9	-13.5	-12.1	-9.4	-6.1	-1.9	+0.5	+2.7	+4.0	+4.8	+6.9
19.0	744	-14.0				-12.9	-10.3	-8.6	-6.9	-3.7	-0.5	+2.0	+4.4	+5.5	+6.5	+8.9
20.0	744	-12.0				-11.9	-8.8	-6.6	-4.7	-2.2	+0.2	+3.3	+5.5	+6.5	+7.3	+8.9
21.0	744	-10.0				-7.9	-6.8	-5.5	-4.1	-1.6	+0.7	+3.9	+5.8	+6.8	+7.8	+9.6
22.0	744	-12.0				-10.9	-6.5	-5.4	-4.1	-1.3	+0.9	+4.2	+6.7	+8.3	+8.9	+11.4
23.0	744	-12.0				-10.9	-6.8	-5.4	-3.8	-1.0	+1.5	+4.8	+6.9	+8.3	+9.0	+10.9
24.0	744	-12.0				-10.9	-7.5	-6.0	-3.8	-1.4	+1.5	+4.9	+7.5	+9.0	+10.6	+12.9
25.0	744	-12.0				-11.9	-8.5	-7.1	-5.1	-1.7	+1.1	+5.0	+7.2	+8.2	+9.5	+12.4
26.0	744	-16.0				-13.9	-10.1	-8.1	-6.2	-2.9	+0.5	+4.5	+7.1	+8.6	+10.0	+11.4
27.0	744	-14.0				-13.9	-11.6	-9.0	-7.7	-4.2	-0.0	+3.9	+6.8	+8.0	+9.3	+12.9
28.0	74	-0.2				-8.2	-6.7	-5.0	-3.0	0.4	6.0	9.4	11.2	14.2	14.4	
29.0	82	-0.6				-8.2	-7.4	-6.0	-4.0	0.1	9.4	9.3	10.1	13.1	13.7	
30.0	84	-11.0				-10.1	-8.6	-6.5	-4.5	-1.4	4.4	7.4	11.0	11.6	12.0	
31.0	85	-16.2				-13.1	-10.7	-7.5	-5.0	-0.9	4.1	9.4	11.0	11.4	12.0	
32.0	90	-16.3				-15.0	-14.5	-9.7	-7.0	-2.9	4.4	7.4	11.0	15.1	16.0	
33.0	90	-21.5				-16.5	-15.6	-12.0	-8.5	-4.5	4.2	5.0	7.0	11.1	11.4	
34.0	90	-24.8				-22.0	-20.2	-15.4	-6.2	-6.2	0.7	5.4	6.0	7.5	7.4	
35.0	90	-24.9				-27.4	-22.5	-17.1	-9.0	-0.4	4.5	6.0	7.1	7.4	7.4	
36.0	91	-30.3				-24.5	-23.4	-14.5	-11.1	-0.5	4.5	5.4	7.1	7.1	7.4	
37.0	90	-31.1				-31.0	-25.5	-20.2	-10.6	0.4	5.3	7.4	8.0	8.0	8.4	
38.0	89	-32.6				-31.5	-24.0	-22.4	-10.4	0.5	6.1	6.7	7.2	7.2	7.4	
39.0	94	-31.4				-30.0	-24.4	-22.0	-12.0	-0.4	6.4	7.0	12.1	13.1	13.4	
40.0	95	-34.5				-32.4	-31.1	-24.5	-12.2	-0.5	6.4	8.0	13.0	13.4	13.4	
41.0	94	-34.2				-37.0	-34.3	-23.4	-13.2	0.4	8.3	10.0	15.0	15.4	15.7	
42.0	97	-44.5				-39.4	-35.1	-25.0	-13.5	-1.1	7.2	8.0	14.0	14.7	14.4	
43.0	97	-44.3				-40.4	-35.1	-29.6	-15.5	-0.7	7.4	9.0	13.7	14.2	14.3	
44.0	94	-41.7				-38.0	-35.3	-29.6	-18.5	-2.6	7.3	10.0	14.1	15.1	15.2	
45.0	92	-37.3					-36.4	-29.4	-17.0	-3.1	5.2	7.0	15.1	16.0	16.1	
46.0	93	-41.4				-38.0	-37.2	-30.0	-16.4	-4.2	4.4	5.0	16.1	16.7	16.4	
47.0	91	-47.2				-39.0	-37.7	-30.0	-14.2	-5.1	4.6	8.0	12.1	12.4	12.4	
48.0	89	-42.3				-41.5	-39.3	-33.0	-14.2	-5.1	4.6	8.0	8.7	9.1	9.2	
49.0	84	-45.7				-45.0	-41.5	-35.1	-21.0	-4.5	2.7	4.0	5.2	6.2	6.4	
50.0	84	-44.9				-45.1	-42.4	-35.0	-21.5	-7.4	-2.2	1.4	2.1	2.7	2.4	
51.0	79	-50.9				-44.2	-42.1	-35.7	-20.0	-7.3	-2.1	0.1	0.0	1.4	1.4	
52.0	75	-50.2					-41.6	-35.4	-22.0	-8.0	-1.7	0.4	1.1	1.4	1.4	
53.0	70	-56.4				-47.4	-41.5	-36.7	-27.0	-0.1	-1.4	-1.4	-0.4	-0.6	-0.5	
54.0	63	-47.6				-46.4	-45.4	-34.5	-20.2	-10.5	-5.1	-2.4	-2.0	-1.7	-1.6	
55.0	57	-49.1				-46.7	-45.6	-39.0	-24.7	-11.0	-4.3	-3.4	-2.7	-2.6	-2.6	
56.0	48	-44.9				-46.0	-45.6	-47.0	-30.5	-14.4	-6.2	-5.1	-4.2	-3.6	-3.6	
57.0	40	-50.2					-49.5	-45.7	-29.4	-13.2	-4.0	-3.0	-2.9	-2.9	-2.9	
58.0	34	-55.1					-50.3	-45.5	-30.0	-10.4	-1.7	0.9	0.4	0.4	0.4	
59.0	27	-54.5					-54.3	-43.0	-24.5	-8.4	-0.4	4.4	4.4	5.0	5.1	
60.0	22	-57.2					-54.0	-44.5	-24.0	-7.5	1.0	14.0	15.7	15.0	15.0	
61.0	14	-60.6						-51.4	-30.5	-11.2	17.3	17.4	17.4	17.4	17.4	
62.0	4	-52.7							-44.0	-13.5	-13.1	-12.0	-12.0	-12.4	-12.4	
63.0	2	-59.7							-50.0	-33.0	-32.7	-32.4	-32.4	-32.4	-32.4	
64.0	1	-29.7														
65.0	1	-30.4														
66.0	1	-17.2														
67.0	1	-10.2														
68.0	1	-3.1														
69.0	1	-3.7														
70.0	1	-10.3														

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM	MIN	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-11.0			-9.1	-7.7	-6.2	-3.9	-0.7	+1.3	+3.1	+3.9	+4.8	+6.5	+7.0	
1.0	720	-22.0			-15.3	-11.9	-9.7	-5.6	-0.4	+3.9	+7.2	+8.8	+9.8	+14.0	+15.0	
2.0	720	-26.0			-18.3	-15.4	-11.4	-6.8	-1.5	+2.6	+6.0	+7.2	+8.1	+9.5	+10.0	
3.0	720	-29.0			-20.8	-17.5	-13.9	-9.1	-3.3	+1.0	+4.1	+5.1	+5.9	+8.0	+9.0	
4.0	720	-32.0			-21.9	-17.8	-16.1	-11.3	-5.0	-0.1	+2.7	+4.6	+5.7	+8.5	+9.0	
5.0	720	-33.0			-25.3	-22.8	-18.7	-13.7	-6.9	-0.7	+1.9	+3.9	+5.6	+8.0	+9.0	
6.0	720	-36.0			-28.9	-25.1	-21.6	-16.3	-8.8	-2.0	+0.7	+4.0	+5.9	+12.0	+13.0	
7.0	720	-38.0			-31.7	-27.9	-25.1	-19.1	-11.2	-3.6	-0.0	+3.9	+6.4	+15.0	+16.0	
8.0	720	-45.0			-39.2	-34.3	-27.8	-21.8	-13.2	-4.8	-0.3	+2.3	+6.9	+16.0	+17.0	
9.0	720	-49.0			-41.8	-35.4	-30.6	-24.3	-15.4	-6.5	-0.5	+2.5	+6.4	+22.0	+23.0	
10.0	720	-54.0			-44.8	-39.3	-34.4	-27.8	-17.3	-7.2	-1.3	+2.2	+6.4	+25.0	+26.0	
11.0	720	-59.0			-46.3	-43.1	-38.5	-30.7	-19.6	-8.5	-2.9	+1.7	+5.8	+27.0	+28.0	
12.0	720	-54.0			-47.3	-44.7	-40.7	-32.6	-21.4	-10.4	-3.9	-0.4	+8.4	+33.0	+34.0	
13.0	720	-60.0			-45.5	-43.5	-40.4	-31.8	-21.5	-11.7	-5.0	-0.8	+4.8	+32.0	+33.0	
14.0	720	-48.0			-42.8	-39.6	-36.0	-29.1	-20.4	-10.7	-5.4	-2.2	+2.8	+26.0	+27.0	
15.0	720	-46.0			-36.3	-33.6	-30.0	-24.9	-17.3	-9.6	-4.6	-2.1	+0.1	+17.0	+18.0	
16.0	720	-33.0			-30.5	-28.3	-25.5	-20.8	-14.5	-7.0	-2.3	+0.3	+1.2	+17.0	+18.0	
17.0	720	-28.0			-25.4	-24.1	-21.6	-16.9	-10.6	-4.4	-0.8	+1.2	+3.4	+24.0	+25.0	
18.0	720	-24.0			-20.1	-18.2	-16.2	-12.6	-7.1	-1.8	+1.3	+2.5	+4.2	+10.0	+11.0	
19.0	720	-19.0			-15.4	-13.9	-12.3	-9.1	-4.5	-0.4	+2.1	+3.5	+4.9	+6.5	+7.0	
20.0	720	-18.0			-12.9	-11.5	-10.1	-6.8	-3.0	+0.1	+2.9	+4.3	+5.4	+12.0	+13.0	
21.0	720	-19.0			-12.2	-10.4	-8.7	-6.1	-2.2	+0.7	+3.3	+4.2	+5.4	+8.0	+9.0	
22.0	720	-19.0			-12.9	-11.3	-9.3	-6.3	-1.9	+1.0	+3.4	+4.2	+4.9	+5.8	+6.0	
23.0	720	-20.0			-14.7	-12.1	-9.5	-6.5	-2.3	+0.9	+3.7	+5.4	+6.8	+8.6	+9.0	
24.0	720	-19.0			-14.8	-13.4	-10.6	-7.6	-3.1	+0.8	+4.2	+5.9	+7.4	+11.0	+12.0	
25.0	720	-28.0			-16.9	-14.4	-12.5	-9.3	-4.3	+0.2	+4.1	+5.8	+7.5	+10.5	+11.0	
26.0	720	-24.0			-17.3	-15.5	-14.2	-10.9	-5.8	-0.1	+4.0	+6.5	+9.5	+15.0	+16.0	
27.0	720	-26.0			-18.6	-17.6	-16.0	-12.6	-7.1	-0.6	+5.3	+8.8	+11.4	+18.0	+19.0	
28.0	84	-29.6			-20.0	-15.4	-12.0	-8.5	-0.6	6.4	13.4	20.1	20.9	21.0		
29.0	90	-29.7			-21.0	-16.5	-13.0	-9.3	-1.0	5.4	11.4	20.1	20.9	20.9		
30.0	90	-25.5			-26.0	-20.5	-16.0	-9.5	-0.4	5.4	10.4	15.1	15.4	16.0		
31.0	91	-31.4			-25.0	-23.7	-19.3	-11.2	-1.9	5.4	7.4	10.1	10.6	10.7		
32.0	91	-31.5			-27.0	-25.7	-19.0	-13.2	-0.5	2.5	4.0	7.1	9.0	9.1		
33.0	92	-31.9			-30.2	-28.7	-23.7	-15.5	-7.1	1.4	3.0	11.1	11.9	12.0		
34.0	92	-31.5			-32.0	-31.2	-25.7	-19.0	-7.1	-0.5	1.0	15.1	15.1	16.3		
35.0	92	-35.2			-34.5	-29.4	-26.0	-19.2	-11.5	1.4	7.4	17.1	19.2	19.4		
36.0	90	-34.2			-35.0	-34.4	-28.0	-22.5	-11.1	-1.2	6.4	19.1	19.7	19.4		
37.0	91	-41.0			-38.0	-34.5	-29.5	-22.5	-9.7	-2.3	3.0	21.1	21.8	21.9		
38.0	95	-40.3			-37.0	-37.1	-31.2	-23.0	-13.0	0.3	8.4	12.1	13.3	13.4		
39.0	94	-40.1			-36.0	-35.7	-32.0	-25.5	-14.6	0.2	1.0	9.1	10.2	10.3		
40.0	93	-46.3			-40.0	-38.1	-32.0	-27.1	-14.0	-2.4	0.0	2.1	2.7	2.9		
41.0	93	-40.1			-46.0	-43.1	-34.0	-27.1	-15.0	-8.4	-7.4	-5.0	-4.9	-4.8		
42.0	93	-40.7			-46.0	-42.4	-35.0	-27.5	-16.3	-11.5	-4.1	-6.0	-5.7	-5.5		
43.0	92	-51.1			-44.0	-42.4	-35.4	-27.5	-16.3	-11.5	-4.1	-6.0	-5.7	-5.5		
44.0	84	-51.5			-47.7	-42.9	-35.7	-29.2	-18.3	-13.7	-12.0	-2.9	-2.4	-2.4		
45.0	87	-60.3			-40.0	-46.6	-38.1	-29.1	-19.0	-14.4	-13.5	0.1	0.0	1.1		
46.0	86	-50.2			-44.0	-45.8	-40.0	-29.7	-19.8	-13.3	-7.4	1.1	1.8	2.0		
47.0	83	-60.4			-53.1	-50.9	-44.3	-31.2	-21.1	-13.5	-8.0	2.2	2.9	3.0		
48.0	82	-64.2			-58.6	-54.9	-46.0	-33.7	-20.5	-15.1	-10.4	7.2	7.4	7.9		
49.0	85	-67.3			-63.1	-57.6	-47.0	-33.0	-21.2	-11.5	-2.0	9.1	9.6	9.7		
50.0	84	-64.8			-66.1	-62.0	-49.7	-37.7	-25.7	-13.2	-5.0	3.2	4.1	4.3		
51.0	77	-74.6			-70.2	-65.2	-51.4	-40.5	-28.1	-12.4	-0.0	-0.4	-0.1	0.0		
52.0	74	-74.5			-64.3	-62.6	-51.1	-40.7	-28.7	-12.7	-2.7	-0.7	-0.1	0.0		
53.0	70	-74.2			-69.4	-65.7	-55.3	-42.0	-27.5	-11.5	-5.4	-0.7	-0.1	0.0		
54.0	61	-79.8			-66.6	-62.5	-54.7	-43.1	-27.3	-19.0	-8.4	-4.2	-7.4	-7.4		
55.0	52	-64.9			-64.8	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
56.0	47	-70.7			-69.0	-64.7	-55.8	-44.5	-28.2	-19.3	-14.1	-8.4	-7.9	-7.9		
57.0	45	-79.2			-76.0	-69.7	-55.0	-46.7	-31.1	-15.2	-10.4	1.0	1.7	1.8		
58.0	34	-81.8			-72.1	-65.1	-56.0	-44.7	-30.5	-12.0	3.1	3.4	4.0	4.0		
59.0	29	-64.1			-63.8	-60.4	-54.5	-44.5	-30.3	-18.4	-6.4	-6.6	-6.4	-6.4		
60.0	21	-79.2			-67.7	-62.7	-56.0	-44.7	-30.5	-12.0	3.1	3.4	4.0	4.0		
61.0	16	-64.4			-67.4	-62.7	-56.0	-44.7	-30.5	-12.0	3.1	3.4	4.0	4.0		
62.0	15	-69.4			-67.4	-62.7	-56.0	-44.7	-30.5	-12.0	3.1	3.4	4.0	4.0		
63.0	11	-74.8			-75.3	-69.5	-58.7	-47.5	-31.5	-11.9	-11.4	-11.4	-11.4	-11.4		
64.0	7	-117.0			-75.3	-69.5	-58.7	-47.5	-31.5	-11.9	-11.4	-11.4	-11.4	-11.4		
65.0	6	-57.1			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
66.0	4	-54.8			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
67.0	4	-57.5			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
68.0	4	-51.4			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
69.0	3	-29.0			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
70.0	2	-20.5			-65.0	-60.4	-53.7	-42.5	-29.3	-16.4	-11.2	-4.4	-8.5	-8.5		
Positive is wind from the right (135°). Negative is wind from the left (315°).																

Positive is wind from the right (135°).
Negative is wind from the left (315°).

RIGHT AND LEFT CROSS WIND COMPONENTS 45 DEGREE FLIGHT AZIMUTH

TABLE 5.12

DATA SOURCE										DECEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-9.0			-8.7	-7.9		-6.8	-4.1	-1.1	+1.2	+3.2	+3.9	+4.8	+6.6	+7.0	
10	744	-21.0			-16.9	-14.6		-11.6	-6.7	-0.4	+4.3	+6.9	+8.6	+10.6	+13.9	+18.0	
20	744	-22.0		-21.9	-19.5	-16.2		-13.4	-8.7	-2.2	+2.3	+4.7	+6.4	+7.7	+12.9	+20.0	
30	744	-29.0			-28.9	-23.5	-19.7	-15.7	-10.9	-4.6	+0.1	+2.9	+4.4	+5.8	+8.9	+11.0	
40	744	-32.0				-24.9	-22.4	-19.2	-13.2	-6.8	-0.9	+1.8	+3.7	+5.1	+7.4	+8.0	
50	744	-40.0			-36.9	-29.5	-25.2	-21.9	-15.3	-8.4	-1.7	+0.9	+3.7	+6.7	+13.9	+17.0	
60	744	-43.0			-42.9	-31.7	-28.6	-24.8	-18.0	-10.2	-3.0	-0.0	+3.4	+6.3	+10.9	+21.0	
70	744	-46.0			-42.9	-34.7	-30.5	-27.3	-21.1	-12.4	-4.3	-0.0	+2.0	+4.6	+10.9	+34.0	
80	744	-49.0			-43.9	-36.7	-32.8	-30.2	-23.6	-14.3	-5.8	-0.4	+2.5	+5.7	+14.9	+28.0	
90	744	-50.0			-49.9	-42.1	-38.4	-35.2	-26.9	-16.3	-6.7	-1.1	+2.2	+5.2	+15.9	+25.0	
100	744	-60.0			-55.9	-50.1	-45.6	-39.5	-30.5	-18.0	-7.7	-1.0	+1.8	+4.8	+16.9	+30.0	
110	744	-62.0			-61.9	-52.2	-47.6	-41.8	-32.6	-20.1	-8.5	-0.8	+1.2	+7.1	+14.9	+19.0	
120	744	-63.0			-61.9	-54.5	-49.4	-44.5	-34.3	-21.6	-9.8	-2.3	+1.6	+7.2	+14.9	+25.0	
130	744	-73.0			-61.9	-51.7	-46.2	-41.6	-34.1	-21.7	-11.1	-4.6	-0.9	+3.3	+6.9	+17.0	
140	744	-83.0			-61.9	-43.5	-40.1	-38.3	-31.7	-21.2	-12.0	-5.8	-1.5	+0.1	+3.9	+5.0	
150	744	-51.0			-45.9	-39.8	-37.0	-34.3	-28.6	-17.1	-10.8	-5.3	-1.9	-0.3	+2.9	+4.0	
160	744	-45.0			-40.9	-34.8	-32.0	-29.4	-24.5	-14.5	-8.8	-3.7	-0.6	+0.8	+3.9	+5.0	
170	744	-38.0			-35.9	-30.5	-27.7	-24.6	-20.1	-13.4	-7.3	-2.4	-0.0	+2.2	+9.9	+11.0	
180	744	-30.0			-27.9	-25.1	-21.7	-19.5	-15.6	-10.4	-4.8	-0.8	+1.5	+4.1	+8.9	+19.0	
190	744	-26.0			-21.9	-19.3	-17.7	-16.1	-12.1	-7.0	-2.4	-0.0	+2.2	+4.3	+7.9	+11.0	
200	744	-23.0				-20.2	-16.5	-14.0	-9.7	-5.0	-0.9	+0.7	+2.8	+4.7	+7.9	+11.0	
210	744	-23.0		-21.9	-18.1	-14.0	-12.4	-8.7	-4.1	-0.6	+1.3	+2.5	+3.7	+4.9	+7.0		
220	744	-25.0			-19.9	-15.7	-13.3	-11.6	-8.7	-4.6	-0.8	+1.7	+3.1	+4.7	+8.9	+11.0	
230	744	-28.0			-19.9	-18.0	-15.7	-13.4	-9.6	-5.2	-0.8	+1.9	+3.8	+5.7	+8.9	+16.0	
240	744	-27.0			-23.9	-20.1	-18.2	-15.3	-11.5	-6.2	-1.1	+2.4	+3.8	+6.2	+9.4	+10.0	
250	744	-22.0			-23.1	-19.6	-17.1	-13.7	-7.8	-1.3	+2.6	+5.2	+6.7	+9.9	+11.0		
260	744	-30.0			-27.9	-25.8	-22.0	-19.6	-15.4	-8.9	-2.0	+3.8	+7.5	+10.1	+13.9	+16.0	
270	744	-36.0			-32.9	-24.3	-22.4	-20.0	-16.4	-10.1	-1.2	+5.1	+9.5	+12.5	+18.4	+19.0	
280	132	-26.2			-21.0	-21.3	-20.1	-15.1	-9.4	5.0	12.2	14.0	15.5	15.9	15.9		
290	134	-30.2			-27.7	-24.0	-21.8	-18.4	-10.8	4.5	14.2	16.0	16.4	18.1	18.4		
300	132	-33.2			-32.4	-24.4	-25.3	-19.4	-11.0	10.3	17.0	18.4	19.4	19.0	20.1		
310	140	-33.2				-31.4	-28.3	-19.4	-12.4	9.0	21.4	23.0	26.4	29.6	29.7		
320	141	-34.2				-33.4	-29.0	-22.3	-13.2	10.3	27.7	29.4	31.4	33.5	33.6		
330	141	-44.5				-39.4	-34.0	-29.0	-24.7	-12.5	11.6	29.0	31.0	33.6	35.6		
340	141	-47.0				-37.6	-33.0	-32.0	-26.0	-13.4	11.6	26.0	29.0	38.6	44.5		
350	141	-41.0				-40.8	-37.4	-35.0	-28.2	-14.1	15.6	23.0	25.0	35.4	44.4		
360	141	-44.1				-42.0	-42.3	-38.3	-31.0	-14.1	14.4	24.0	29.0	31.4	44.4		
370	141	-54.2				-50.4	-46.4	-44.0	-33.0	-16.7	15.3	25.0	30.0	45.4	47.0		
380	141	-65.4				-56.4	-55.7	-50.0	-35.4	-16.0	17.3	26.7	35.0	37.4	42.4		
390	142	-64.8				-63.4	-60.0	-49.4	-36.0	-19.3	19.2	33.2	34.0	39.4	40.3		
400	142	-67.5				-66.4	-61.4	-49.4	-38.7	-20.3	19.7	34.0	40.4	42.4	46.1		
410	142	-74.0				-65.4	-54.4	-52.0	-40.4	-21.4	19.5	30.5	35.0	41.4	44.6		
420	140	-60.0					-57.0	-55.0	-40.0	-19.4	19.4	32.3	34.0	35.4	40.5		
430	139	-54.9				-53.4	-49.1	-42.3	-17.5	16.0	33.0	35.0	40.4	42.9	43.1		
440	140	-64.2				-57.4	-52.0	-50.0	-41.4	-19.0	18.4	29.0	32.4	35.4	41.0		
450	134	-74.1				-63.4	-55.0	-52.1	-45.0	-16.7	12.4	24.1	33.0	40.6	43.7		
460	137	-75.2				-69.4	-57.0	-55.0	-48.0	-18.2	10.1	26.2	32.0	41.0	42.3		
470	134	-69.3				-66.4	-60.0	-57.5	-49.4	-16.0	12.1	25.1	32.0	38.0	45.6		
480	134	-66.5				-64.4	-63.0	-58.2	-48.4	-13.0	10.5	18.1	25.0	44.4	46.0		
490	130	-71.5				-67.7	-65.0	-59.2	-49.6	-11.0	7.7	14.4	31.0	45.7	46.4		
500	127	-81.3				-74.7	-64.4	-59.4	-49.2	-10.0	7.0	17.7	30.1	39.7	43.0		
510	122	-84.4				-74.4	-65.2	-59.0	-49.4	-11.0	7.5	22.0	24.0	32.4	39.4		
520	115	-93.0				-72.4	-64.2	-61.2	-48.4	-7.7	10.3	21.3	30.7	32.2	33.0		
530	110	-91.1				-68.0	-65.7	-64.2	-47.5	-10.0	10.3	21.6	26.0	31.2	33.6		
540	102	-84.7				-74.0	-71.7	-63.6	-49.0	-11.3	9.4	22.0	24.0	32.0	36.6		
550	92	-74.4					-72.0	-67.2	-50.7	-11.3	11.1	26.4	29.0	39.1	40.0		
560	81	-74.5					-73.2	-70.5	-52.4	-17.5	7.1	20.0	31.2	42.3	43.3		
570	67	-80.6					-74.5	-71.7	-52.5	-20.5	5.4	14.7	33.0	36.3	36.7		
580	51	-74.1					-54.4	-57.4	-45.0	-17.2	5.6	27.5	30.0	39.5	39.0		
590	34	-72.4					-63.0	-50.4	-27.5	5.4	22.1	30.2	30.0	31.4	31.5		
600	22	-69.1					-66.0	-49.5	-30.0	-4.2	4.0	12.4	12.4	12.7	12.7		
610	15	-77.8						-50.6	-29.5	-10.4	12.2	12.4	12.4	12.7	12.7		
620	8	-64.7						-60.7	-43.0	-23.3	15.4	16.0	16.2	16.2	16.3		
630	2	-71.2							-71.0	-52.2	-51.0	-51.0	-51.4	-51.4	-51.4		
640	1	-65.1													-65.1		

Positive is wind from the right (135°).
Negative is wind from the left (315°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.1

DATA SOURCE											JANUARY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	788	-11.0	-9.9	-8.8	-5.5	-4.2	-2.2	-0.9	+2.0	+4.0	+4.9	+5.7	+6.9	+9.0		
100	788	-11.0	-10.9	-8.8	-5.5	-4.2	-2.2	-0.9	+2.0	+4.0	+4.9	+5.7	+6.9	+9.0		
200	788	-12.0	-10.9	-8.8	-5.5	-4.2	-2.2	-0.9	+2.0	+4.0	+4.9	+5.7	+6.9	+9.0		
300	788	-7.0	-3.9	-2.5	-0.7	+2.1	+8.1	+16.4	+24.3	+27.1	+31.1	+33.4	+37.0	+45.0		
400	788	-6.0	-5.9	-3.2	-1.2	+0.6	+4.5	+11.4	+21.3	+27.4	+32.0	+34.5	+39.4	+45.0		
500	788	-7.0	-6.9	-2.1	+0.6	+1.6	+6.6	+14.0	+25.3	+31.4	+38.2	+42.7	+46.9	+50.0		
600	788	-3.0	-2.9	-1.1	+0.7	+3.6	+7.0	+18.7	+30.2	+37.9	+41.6	+47.2	+53.9	+55.0		
700	788	-10.0	-5.9	-0.7	+1.9	+5.1	+11.0	+21.9	+35.3	+43.2	+49.7	+51.2	+58.9	+60.0		
800	788	-10.0	-7.9	-2.1	+5.7	+13.5	+25.3	+39.6	+58.4	+69.0	+76.5	+82.9	+84.0			
900	788	-8.0	-6.9	-1.7	+0.9	+5.8	+15.0	+28.0	+44.5	+54.4	+61.0	+65.2	+72.9	+77.0		
1000	788	-13.0	-12.9	-2.8	+1.3	+6.0	+17.1	+32.0	+59.7	+69.0	+76.5	+82.9	+84.0			
1100	788	-18.0	-6.9	-1.5	+1.8	+7.5	+18.9	+35.4	+53.8	+62.8	+70.0	+76.5	+85.9	+101.0		
1200	788	-12.0	-5.9	+0.2	+3.4	+7.3	+21.4	+37.7	+54.1	+64.0	+70.3	+77.7	+83.9	+84.0		
1300	788	-9.0	-2.9	+9.4	+8.3	+14.2	+24.2	+37.7	+53.0	+63.3	+73.5	+82.9	+84.0			
1400	788	+4.0	+6.6	+10.9	+15.3	+23.7	+34.7	+49.5	+59.0	+64.2	+68.5	+79.9	+84.0			
1500	788	+1.0	+3.0	+8.4	+11.4	+20.8	+31.7	+43.9	+53.1	+56.8	+65.2	+74.9	+78.0			
1600	788	+1.0	+2.0	+6.4	+8.4	+12.0	+18.0	+27.5	+37.5	+45.0	+48.2	+51.5	+59.4	+60.0		
1700	788	+0.0	+0.0	+3.1	+6.0	+7.7	+13.3	+21.4	+30.6	+38.2	+41.4	+44.5	+51.9	+57.0		
1800	788	+4.0	+0.6	+0.9	+4.0	+8.6	+15.3	+23.7	+30.9	+35.5	+38.6	+40.9	+45.0			
1900	788	-7.0	-5.9	-3.3	+1.0	+0.4	+3.2	+10.0	+16.9	+24.5	+30.5	+34.1	+44.9	+49.0		
2000	788	+8.0	-7.9	-5.3	+4.2	+2.5	+0.6	+0.1	+12.8	+19.1	+22.4	+25.6	+35.9	+39.0		
2100	788	-15.0	-12.9	-8.7	-7.0	-4.1	-0.7	+4.0	+10.2	+16.4	+20.6	+22.9	+27.9	+34.0		
2200	788	-26.0	-18.9	-11.5	-9.0	-5.6	-1.9	+3.1	+9.7	+15.5	+21.0	+26.5	+36.9	+42.0		
2300	788	-19.0	-17.9	-13.5	-10.6	-7.3	-2.6	+2.7	+9.4	+15.9	+22.0	+25.7	+36.4	+37.0		
2400	788	-23.0	-20.9	-16.7	-12.2	-8.9	-3.4	+3.2	+10.1	+17.2	+22.3	+25.9	+34.9	+41.0		
2500	788	-18.0	-17.9	-14.2	-11.5	-8.8	-3.4	+4.1	+12.4	+18.7	+23.2	+26.3	+34.9	+37.0		
2600	788	-25.0	-20.9	-15.6	-13.6	-9.7	-3.5	+5.1	+15.9	+22.7	+28.6	+33.3	+45.9	+49.0		
2700	788	-27.0	-22.9	-18.7	-16.2	-11.7	-3.9	+5.9	+18.1	+26.9	+31.5	+37.7	+44.9	+48.0		
2800	106	-16.5	-15.0	-14.5	-10.7	-2.8	4.0	18.4	29.4	29.3	30.4	33.6	33.7			
2900	107	-21.0	-19.0	-18.4	-11.4	-3.7	0.2	22.5	26.0	29.0	30.4	36.2	36.4			
3000	108	-28.8	-20.0	-19.5	-15.6	-0.4	18.2	27.3	31.5	36.4	38.6	40.0	40.2			
3100	109	-29.0	-29.0	-28.5	-18.4	-6.7	18.4	29.4	36.4	39.4	39.4	39.4	39.4			
3200	113	-36.8	-29.0	-28.4	-21.3	-5.0	16.5	32.0	38.5	40.2	40.2	42.5	42.5			
3300	115	-44.6	-41.4	-30.4	-27.1	-3.4	18.4	33.5	36.0	40.0	42.0	47.4	47.4			
3400	117	-47.1	-44.0	-44.2	-28.1	-4.2	20.4	32.5	39.2	46.4	46.4	49.4	49.4			
3500	116	-55.0	-49.4	-45.4	-40.2	-4.4	20.5	32.0	39.2	45.4	49.4	51.5	51.5			
3600	116	-54.7	-57.4	-48.4	-42.2	-1.3	22.0	33.1	39.1	50.9	50.9	52.0	52.0			
3700	114	-65.9	-52.0	-51.4	-47.3	-3.6	21.3	33.0	40.3	51.0	52.5	53.2	53.3			
3800	115	-65.7	-56.0	-56.2	-46.2	-3.4	21.3	35.4	41.1	48.0	52.5	53.0	53.1			
3900	117	-60.1	-56.0	-56.2	-51.1	-3.5	20.3	36.1	44.1	45.7	52.4	53.5	53.5			
4000	115	-61.3	-57.4	-56.4	-52.2	-4.4	24.5	36.4	46.4	48.7	53.5	54.0	54.1			
4100	117	-64.2	-57.0	-54.7	-51.1	-5.1	21.5	39.1	47.5	50.4	55.4	56.6	56.7			
4200	114	-61.1	-55.0	-54.4	-26.3	-3.3	21.3	39.0	48.7	56.0	58.0	59.5	59.5			
4300	113	-70.9	-55.0	-49.4	-26.3	-4.7	21.5	38.5	53.4	52.0	63.0	64.4	64.9			
4400	113	-74.4	-55.0	-50.4	-26.3	-4.7	21.5	32.5	53.4	52.0	69.5	70.2	70.3			
4500	111	-75.5	-55.0	-52.5	-26.4	-1.4	24.4	41.4	52.5	58.2	68.0	73.6	73.7			
4600	110	-73.5	-54.0	-51.5	-23.5	-0.4	24.4	42.5	58.3	64.6	66.0	76.4	76.9			
4700	106	-71.0	-53.0	-47.5	-21.3	-1.4	27.5	45.4	60.7	67.4	70.4	75.5	76.5			
4800	104	-66.6	-52.0	-44.5	-21.4	-1.5	29.5	44.1	56.0	67.4	71.0	76.1	76.1			
4900	100	-55.8	-56.0	-40.7	-21.0	-1.1	30.0	44.4	54.0	65.7	74.0	76.0	76.5			
5000	100	-62.3	-56.0	-32.7	-21.0	3.3	32.0	50.5	60.0	70.7	76.0	76.5	76.5			
5100	95	-61.6	-28.4	-20.2	2.1	33.5	52.2	63.3	70.4	76.0	76.0	76.4	76.4			
5200	88	-56.9	-27.0	-21.6	2.0	33.7	54.0	64.3	70.4	77.1	77.1	77.4	77.4			
5300	83	-52.1	-33.1	-19.4	5.4	36.5	54.0	64.0	70.4	77.1	77.2	78.1	78.2			
5400	72	-26.1	-22.4	-14.4	4.8	41.0	60.2	69.4	77.4	79.4	80.2	80.3	80.3			
5500	64	-20.7	-15.4	-11.4	4.0	36.0	61.5	72.4	83.4	85.4	86.4	86.9	86.9			
5600	57	-14.9	-13.7	-7.1	12.0	42.5	64.0	77.2	74.7	91.3	91.5	91.7	91.7			
5700	46	-11.9	-11.0	-7.7	13.3	44.0	74.7	84.7	96.4	103.4	103.6	103.7	103.7			
5800	26	-10.8	-5.7	-5.7	-5.7	-5.7	9.1	44.0	74.4	100.7	132.4	132.4	133.1	133.2		
5900	14	-4.7					9.0	41.0	72.1	109.1	109.7	110.0	110.2	110.2		
6000	10	0.3					11.4	36.0	61.4	71.4	71.4	71.4	71.4	71.4		
6100	7	3.7					13.1	40.5	60.0	61.4	61.4	61.4	61.4	61.4		
6200	6	20.4						55.0	65.0	65.4	65.4	65.4	65.4	65.4		
6300	5	20.7						55.5	80.2	80.4	81.0	81.0	81.1	81.1		
6400	4	13.5						47.0	63.5	64.0	64.0	64.2	64.2	64.3		
6500	3	24.9						40.5	61.7	62.1	62.2	62.2	62.3	62.3		
6600	3	12.6						47.5	59.7	60.2	60.3	60.4	60.4	60.4		
6700	3	20.9						39.5	54.4	54.5	54.7	54.7	54.7	54.7		
6800	4	21.7						42.0	103.4	103.4	103.4	103.4	103.4	103.4		
6900	4	10.4						41.0	104.5	104.1	104.1	104.1	104.1	104.1		
7000	4	10.7						36.0	114.3	114.7	114.8	114.8	114.8	114.8		

Positive is wind from the tail (240°).
Negative is wind from the head (60°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	67d	-7.0			-6.8	-5.6	-4.3	-2.4	-0.4	+2.2	+5.1	+5.9	+7.5	+10.0	+5.9	+11.0
1.0	67b	-17.0			-10.0	-9.1	-7.1	-2.1	+3.0	+10.0	+15.7	+18.4	+21.7	+26.0	+27.0	
2.0	67d	-10.0			-8.0	-5.5	-2.8	-0.0	+6.1	+14.6	+20.5	+24.5	+26.6	+31.0	+32.0	
3.0	67d	-6.0			-1.6	-2.9	-1.0	+2.6	+9.4	+18.6	+25.6	+28.6	+30.8	+37.5	+38.0	
4.0	67d	-6.0			-1.9	-1.0	-0.0	+4.4	+11.8	+22.8	+30.0	+33.6	+37.1	+43.0	+44.0	
5.0	67d	-6.0			-1.0	-0.4	+1.1	+6.2	+15.7	+26.4	+34.8	+39.5	+42.4	+57.0	+58.0	
6.0	67d	-6.0			-1.0	-0.2	+1.6	+8.4	+20.0	+32.5	+40.2	+44.1	+48.4	+62.0	+63.0	
7.0	67d	-6.0			-1.1	+0.3	+3.3	+9.4	+23.1	+36.8	+46.6	+52.5	+58.0	+70.0	+71.0	
8.0	67d	-10.0			-0.8	+0.1	+4.2	+11.7	+26.1	+41.9	+52.7	+60.1	+65.2	+81.0	+82.0	
9.0	67d	-13.0			-4.2	-1.2	+4.5	+12.7	+30.1	+46.8	+60.4	+67.1	+73.0	+81.0	+82.0	
10.0	67d	-12.0			-9.2	-1.2	+5.3	+14.1	+34.2	+51.7	+64.7	+68.7	+73.1	+89.0	+90.0	
11.0	67d	-19.0			-9.2	+1.2	+5.9	+16.2	+36.2	+53.7	+67.8	+75.5	+82.2	+92.0	+93.0	
12.0	67d	-12.0			-3.2	+3.2	+9.2	+18.8	+38.7	+57.6	+70.7	+78.0	+85.2	+94.5	+95.0	
13.0	67d	-8.0			+4.2	+8.1	+12.4	+20.5	+38.1	+56.1	+69.7	+77.2	+83.0	+92.0	+93.0	
14.0	67d	-9.0			+3.8	+9.0	+14.2	+20.3	+35.5	+51.1	+60.8	+67.5	+75.6	+81.0	+82.0	
15.0	67d	-5.0			+4.7	+9.3	+12.7	+18.2	+31.2	+44.5	+53.5	+57.6	+62.2	+66.0	+67.0	
16.0	67d	-9.0			+1.7	+8.0	+11.0	+15.7	+26.2	+38.7	+45.6	+49.5	+51.7	+62.0	+63.0	
17.0	67d	-17.0			+1.2	+3.6	+7.2	+12.2	+21.1	+31.3	+38.6	+42.3	+44.3	+58.0	+59.0	
18.0	67d	-12.0			-2.6	-0.1	+2.8	+7.6	+14.5	+24.5	+30.9	+36.1	+40.6	+46.5	+47.0	
19.0	67d	-11.0			-3.1	-0.8	-0.0	+2.9	+8.9	+17.8	+26.0	+29.2	+31.0	+44.0	+45.0	
20.0	67d	-12.0			-9.0	-5.7	-4.0	-0.6	+4.7	+12.5	+18.8	+22.8	+26.1	+40.0	+41.0	
21.0	67d	-15.0			-11.6	-9.8	-6.3	-2.4	+2.0	+8.3	+14.2	+17.1	+23.1	+29.0	+30.0	
22.0	67d	-22.0			-13.8	-11.3	-8.8	-3.5	+0.5	+6.7	+11.6	+15.5	+18.6	+24.0	+25.0	
23.0	67d	-26.0			-14.2	-12.3	-9.8	-4.1	+0.2	+4.1	+11.5	+14.5	+17.0	+21.5	+22.0	
24.0	67d	-21.0			-17.2	-13.5	-9.7	-4.5	+0.8	+6.8	+11.2	+13.3	+15.2	+16.6	+17.0	
25.0	67d	-24.0			-10.1	-14.7	-10.9	-5.5	+0.9	+7.6	+11.6	+14.5	+16.1	+22.0	+23.0	
26.0	67d	-33.0			-17.7	-15.4	-11.8	-5.3	+1.5	+8.3	+13.3	+16.0	+18.3	+25.5	+26.0	
27.0	67d	-43.0			-19.2	-15.6	-11.8	-5.3	+2.1	+9.4	+15.3	+17.8	+23.0	+27.0	+28.0	
28.0	82	-10.8			-10.1	-9.3	-7.3	-1.3	+4.3	+14.0	+19.5	+21.1	+24.4	+25.0	+25.1	
29.0	82	-12.8			-11.1	-10.3	-8.0	-0.0	+6.0	+16.0	+21.0	+23.1	+26.1	+25.7	+25.4	
30.0	81	-13.8			-12.6	-10.0	-7.1	+1.2	+11.1	+19.1	+24.0	+27.1	+27.7	+24.2	+24.2	
31.0	81	-12.0			-11.2	-8.0	-3.8	+3.8	+14.3	+24.0	+24.5	+31.2	+32.1	+32.7	+32.8	
32.0	81	-15.9			-14.2	-5.6	-3.5	+3.5	+14.5	+27.2	+34.0	+35.4	+46.2	+46.9	+47.0	
33.0	84	-17.9			-12.0	-7.4	-2.5	+2.5	+20.8	+29.0	+34.5	+36.2	+42.0	+42.5	+42.5	
34.0	94	-11.6			-10.0	-8.1	-1.0	+1.0	+18.8	+29.5	+36.2	+37.0	+42.0	+42.5	+42.5	
35.0	100	-16.5			-9.7	-6.7	-1.0	+1.0	+17.5	+29.1	+37.5	+38.0	+41.5	+42.0	+42.1	
36.0	102	-21.2			-10.0	-8.4	-7.4	-2.2	+17.7	+24.6	+41.4	+42.4	+43.0	+44.5	+44.6	
37.0	106	-23.5			-11.3	-8.0	-3.3	+3.3	+14.5	+30.3	+40.3	+41.4	+42.0	+50.6	+50.7	
38.0	107	-23.2			-18.6	-11.6	-3.5	+3.5	+10.7	+31.5	+39.4	+47.4	+48.0	+49.0	+50.0	
39.0	109	-24.2			-16.5	-12.6	-5.1	+2.1	+31.0	+39.0	+45.4	+46.0	+46.0	+54.1	+54.1	
40.0	103	-31.9			-23.0	-20.5	-13.5	-7.1	+22.1	+32.5	+43.3	+44.8	+59.0	+65.4	+65.5	
41.0	112	-34.2			-27.0	-17.5	-9.7	-7.2	+23.3	+34.4	+49.5	+49.5	+65.0	+73.3	+73.5	
42.0	103	-35.5			-20.0	-10.5	-6.5	+0.1	+24.2	+35.8	+49.5	+53.8	+69.0	+74.4	+74.7	
43.0	104	-35.9			-21.9	-15.5	-3.5	+0.1	+25.2	+39.0	+52.4	+55.5	+70.0	+75.5	+75.7	
44.0	106	-35.9			-23.0	-13.4	-0.7	+0.8	+26.5	+44.1	+55.0	+72.4	+73.0	+75.2	+75.4	
45.0	106	-40.5			-22.0	-8.6	-1.7	+1.0	+29.3	+44.0	+59.7	+73.4	+74.0	+75.5	+75.5	
46.0	102	-37.6			-20.0	-4.7	+1.1	+16.1	+30.0	+49.2	+64.2	+73.7	+76.0	+77.0	+77.1	
47.0	102	-31.3			-16.0	-2.7	+1.6	+14.3	+32.0	+51.8	+66.5	+73.7	+76.0	+79.0	+79.2	
48.0	94	-30.8			0.2	+3.5	+14.4	+34.0	+53.5	+66.1	+74.8	+76.0	+76.0	+76.4	+76.6	
49.0	95	-31.0			3.2	+4.5	+20.7	+34.7	+53.5	+66.4	+72.8	+76.1	+77.1	+77.1	+77.2	
50.0	90	-32.3			4.0	+5.8	+21.3	+34.3	+51.0	+65.8	+73.0	+75.1	+77.3	+77.5	+77.5	
51.0	83	-33.6			-3.1	+6.2	+23.0	+35.4	+49.0	+65.0	+73.4	+75.2	+76.2	+76.4	+76.4	
52.0	80	-34.9			-3.6	+7.0	+25.2	+37.0	+54.3	+72.0	+75.9	+77.2	+77.7	+77.7	+77.8	
53.0	74	-35.2			-8.3	+10.7	+28.2	+39.2	+56.3	+70.8	+73.4	+78.2	+78.4	+78.4	+78.9	
54.0	66	-33.1			-10.5	+13.3	+28.2	+43.0	+63.5	+70.2	+77.4	+83.4	+84.0	+84.0	+84.0	
55.0	60	-25.9			-16.2	+17.0	+28.3	+47.0	+67.2	+76.0	+85.4	+89.4	+90.0	+90.1	+90.1	
56.0	50	-18.7			20.0	+20.5	+27.9	+50.0	+66.5	+81.5	+91.0	+100.7	+101.2	+101.3	+101.3	
57.0	45	-20.5			15.0	+22.3	+31.6	+46.5	+64.0	+82.0	+100.0	+120.5	+120.5	+121.0	+121.0	
58.0	39	-10.7			11.0	+34.2	+49.8	+66.8	+79.1	+99.1	+99.1	+99.4	+100.2	+100.3	+100.3	
59.0	27	14.2			24.4	+35.3	+54.3	+77.7	+79.4	+97.4	+97.4	+98.0	+98.0	+98.1	+98.1	
60.0	20	4.5			5.0	42.2	+51.0	+79.8	+85.0	+90.0	+90.0	+90.4	+90.4	+90.4	+90.4	
61.0	11	-2.4				38.1	+65.5	+84.5	+92.5	+93.0	+93.0	+93.2	+93.4	+93.4	+93.4	
62.0	7	-10.7				29.1	+86.3	+87.0	+90.8	+91.1	+91.2	+91.2	+91.3	+91.3	+91.3	
63.0	4	36.2					74.0	+109.2	+109.5	+109.4	+109.4	+109.4	+109.7	+109.7	+109.7	
64.0	2	75.2					75.0	+85.5	+86.7	+86.4	+86.4	+86.4	+86.4	+86.4	+86.4	
65.0	1	68.5														
66.0	2	53.8														
67.0	1	109.5														
68.0	3	94.7														
69.0	3	52.6														
70.0	3	43.6														

Positive is wind from the tail (240°).
Negative is wind from the head (60°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.3

DATA SOURCE										MARCH							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-11.0	-10.9	-8.1	-5.0	-4.6		-2.6	-0.5	+1.9	+4.5	+5.7	+6.5	+9.9	+11.0		
1.0	744	-17.0	-15.9	-13.2	-9.6	-7.0		-2.5	+2.3	+8.3	+13.9	+15.9	+19.7	+24.4	+25.0		
2.0	744	-13.0	-11.9	-7.7	-6.0	-2.9		-0.2	+5.2	+12.7	+18.5	+20.8	+23.5	+30.9	+36.0		
3.0	744	-16.0	-6.5	-2.7	-1.1	-1.1	+1.5	+7.7	+16.7	+22.7	+25.3	+27.2	+40.9	+49.0			
4.0	744	-16.0	-13.7	-4.5	-2.0	-0.4	+3.2	+11.0	+19.7	+26.5	+30.7	+35.5	+48.9	+50.0			
5.0	744	-13.0	-17.7	-5.5	-0.5	+1.1	+5.1	+14.4	+24.2	+31.2	+36.5	+43.2	+48.9	+63.0			
6.0	744	-21.0	-19.9	-3.5	+0.2	+3.2	+8.2	+18.1	+28.6	+37.0	+43.8	+44.5	+53.9	+67.0			
7.0	744	-23.0	-21.9	-1.7	-0.0	+5.2	+10.5	+21.1	+32.5	+41.7	+47.5	+51.0	+61.9	+69.0			
8.0	744	-26.0	-21.7	-7.5	+0.7	+9.8	+12.8	+24.2	+36.6	+46.4	+54.6	+54.5	+70.9	+79.0			
9.0	744	-21.0	-20.9	-3.5	+2.6	+6.1	+17.4	+28.0	+40.3	+53.6	+60.0	+68.7	+80.9	+83.0			
10.0	744	-27.0	-21.9	-5.7	+1.4	+6.7	+17.5	+31.1	+45.4	+57.7	+67.2	+75.2	+80.9	+85.0			
11.0	744	-30.0	-24.9	-3.5	+3.9	+8.7	+19.8	+33.2	+49.9	+61.6	+68.0	+79.5	+92.9	+101.0			
12.0	744	-22.0	-19.9	-0.7	+7.6	+13.0	+21.8	+36.3	+52.8	+63.5	+71.0	+84.2	+97.9	+105.0			
13.0	744	-13.0	-11.9	+2.2	+11.3	+15.3	+23.3	+37.0	+51.3	+59.7	+68.0	+78.5	+89.9	+94.0			
14.0	744	-10.0	-7.7	+11.6	+16.1	+23.3	+33.7	+46.6	+55.5	+60.5	+67.7	+75.9	+78.0				
15.0	744	-7.0	-4.9	+9.9	+13.3	+27.9	+29.0	+39.9	+48.0	+55.0	+60.5	+67.9	+70.0				
16.0	744	-3.0	-2.9	+2.2	+6.9	+11.2	+16.6	+25.9	+34.1	+39.7	+44.6	+50.2	+57.9	+65.0			
17.0	744	-7.0	-2.9	+0.2	+5.7	+7.3	+13.1	+20.7	+28.5	+34.9	+38.2	+41.1	+50.9	+52.0			
18.0	744	-3.0	-0.6	+1.5	+3.5	+7.2	+14.1	+21.9	+28.8	+32.2	+33.9	+39.6	+40.0				
19.0	744	-10.0	-5.9	+1.6	+0.4	+2.4	+7.3	+7.3	+15.4	+21.1	+25.2	+30.1	+35.9	+38.0			
20.0	744	-17.0	-13.9	-7.0	-5.0	-3.4	-0.0	+3.9	+10.2	+16.3	+20.0	+22.7	+31.9	+36.0			
21.0	744	-17.0	-15.9	-12.1	-9.4	-6.8	-2.7	+1.4	+7.1	+11.5	+13.8	+16.2	+22.9	+25.0			
22.0	744	-27.0	-26.7	-12.2	-9.6	-7.5	-3.9	+0.1	+5.0	+9.6	+12.5	+16.5	+23.9	+44.0			
23.0	744	-28.0	-26.9	-16.2	-12.6	-8.9	-5.0	-0.6	+3.9	+7.8	+10.2	+14.8	+21.9	+33.0			
24.0	744	-31.0	-27.9	-19.2	-15.0	-10.3	-5.5	-0.6	+4.3	+8.1	+11.0	+12.7	+19.9	+24.0			
25.0	744	-27.0	-27.9	-16.0	-10.4	-5.4	-0.9	+4.7	+7.7	+12.7	+16.7	+19.9	+26.9	+28.0			
26.0	744	-32.0	-30.9	-23.1	-16.0	-10.4	-5.8	-0.2	+6.1	+11.5	+15.2	+18.7	+26.9	+28.0			
27.0	744	-17.0	-37.9	-25.5	-18.5	-12.7	-5.7	+0.0	+6.8	+11.8	+17.6	+23.2	+30.9	+32.0			
28.0	89	-13.4	-9.5	-5.5	-1.5	-4.9	-1.5	4.9	13.1	15.6	17.0	24.1	24.4	29.9			
29.0	93	-14.3	-5.0	-0.4	0.3	6.5	14.6	19.4	19.0	25.1	25.3	25.3	25.6				
30.0	97	-16.5	-8.4	-3.7	1.1	4.1	17.0	20.1	21.4	24.0	24.0	24.7	24.7	24.8			
31.0	94	-14.5	-6.7	-3.1	2.6	10.0	20.7	23.7	24.4	26.0	26.0	27.2	27.2	27.3			
32.0	101	-20.4	-12.0	-5.0	3.2	8.9	24.6	29.4	32.7	34.0	34.0	34.7	34.7				
33.0	104	-22.4	-7.0	-5.0	3.2	8.9	24.6	29.4	32.7	34.0	34.0	34.7	34.7				
34.0	104	-22.1	-11.0	-8.0	0.0	0.0	24.4	31.5	32.7	34.0	34.0	34.7	34.7				
35.0	109	-19.3	-9.5	-2.3	3.0	0.0	21.6	29.4	31.8	32.0	32.0	34.4	34.4				
36.0	109	-19.8	-11.5	-4.4	1.4	0.0	21.7	28.0	29.4	31.8	32.0	34.4	34.4				
37.0	113	-20.1	-9.4	-1.4	2.0	0.0	20.4	27.8	29.4	31.8	32.0	34.4	34.4				
38.0	113	-21.5	-14.0	-4.7	4.2	11.4	21.0	27.0	29.4	31.8	32.0	34.4	34.4				
39.0	114	-24.9	-9.0	-4.1	3.8	12.4	21.7	27.4	35.0	35.0	35.0	40.4	41.1				
40.0	114	-34.7	-7.4	-4.2	3.8	14.0	23.0	30.4	35.0	39.4	42.6	42.6	42.7				
41.0	114	-35.7	-10.4	-5.4	3.1	15.4	23.0	32.7	37.0	42.6	42.6	42.6	42.6				
42.0	114	-35.4	-12.4	-8.7	4.4	16.4	26.2	32.7	37.7	44.4	44.4	44.4	44.4				
43.0	114	-37.8	-10.0	-7.4	-0.3	0.3	19.2	29.5	39.4	47.0	47.0	47.0	47.0				
44.0	113	-28.9	-9.0	-7.4	-0.4	0.3	19.2	29.5	39.4	47.0	47.0	47.0	47.0				
45.0	111	-23.5	-7.0	-6.5	-2.2	0.0	18.4	29.0	42.6	48.4	48.4	47.0	47.0				
46.0	110	-17.6	-8.0	-6.5	0.5	11.4	20.7	31.5	41.5	48.4	50.0	50.0	50.0				
47.0	108	-11.8	-8.0	-5.5	-0.6	13.1	21.9	34.4	44.1	48.4	47.0	47.0	47.0				
48.0	107	-4.9	-8.0	-8.3	2.3	15.0	24.5	35.0	46.1	50.0	50.0	50.0	50.0				
49.0	105	-10.9	-8.0	-7.4	5.1	17.3	27.7	38.3	46.4	50.0	50.0	50.0	50.0				
50.0	102	-9.8	-9.8	-6.7	6.1	19.4	30.0	39.4	46.0	52.7	50.0	50.0	50.0				
51.0	97	-8.4	-3.4	-6.9	20.3	31.2	40.5	49.2	60.0	63.0	63.0	63.0	63.0				
52.0	94	-7.7	-0.0	-11.7	21.2	31.0	42.4	52.3	60.0	62.4	62.4	62.4	62.4				
53.0	87	-16.0	-8.0	14.4	20.4	31.0	43.4	55.7	59.4	62.4	62.4	62.4	62.4				
54.0	80	-17.0	-12.2	4.0	20.7	31.3	42.3	52.7	57.2	60.0	60.0	60.0	60.0				
55.0	60	-15.5	-14.4	7.7	19.0	34.4	44.0	52.7	59.4	62.4	62.4	62.4	62.4				
56.0	60	-11.4	7.2	8.0	29.5	36.3	45.5	52.0	59.6	67.3	67.3	67.3	67.3				
57.0	51	-11.0	15.6	25.1	30.2	44.0	52.5	61.0	65.3	65.7	65.7	65.7	65.7				
58.0	41	-10.6	17.1	26.5	37.8	49.7	58.5	64.1	64.1	64.1	64.1	64.1	64.1				
59.0	32	5.7	14.6	33.0	39.5	54.3	64.4	76.2	76.2	76.2	76.2	76.2	76.2				
60.0	22	19.1	36.5	45.3	54.5	68.0	76.4	76.4	76.4	76.4	76.4	76.4	76.4				
61.0	14	14.6	32.2	45.0	55.8	69.3	69.3	69.3	69.3	69.3	69.3	69.3	69.3				
62.0	10	15.0	27.6	45.0	55.4	61.6	61.6	61.6	61.6	61.6	61.6	61.6	61.6				
63.0	7	13.0	25.1	45.0	56.0	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4				
64.0	5	23.3	25.1	45.0	81.2	81.2	81.2	81.2	81.2	81.2	81.2	81.2	81.2				
65.0	3	10.9	36.5	46.7	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2				
66.0	2	2.3	2.0	21.0	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3				
67.0	1	-1.8															
68.0	1	-2.2															
69.0	1	-2.8															
70.0	1	-3.8															

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.4

DATA SOURCE										APRIL									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)												
				LATITUDE	LONGITUDE														
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967													
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967													
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																			
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)			
5FC	720	-10.0			-7.2	-5.9	-5.2	-3.6	-1.0	+1.4	+3.0	+5.0	+6.7	+10.5	+11.0				
1.0	720	-12.0			-10.1	-9.5	-7.9	-4.7	-0.1	+6.1	+12.2	+15.7	+19.2	+21.0	+22.0				
2.0	720	-17.0			-12.4	-9.3	-6.8	-3.2	+1.3	+8.4	+15.4	+19.8	+20.9	+26.0	+27.0				
3.0	720	-15.0			-10.3	-8.1	-6.3	-2.6	+2.9	+10.6	+18.7	+23.1	+26.6	+32.0	+33.0				
4.0	720	-14.0			-12.7	-9.1	-5.8	-1.6	+4.6	+14.0	+21.8	+25.8	+30.9	+42.0	+43.0				
5.0	720	-14.0			-10.3	-7.6	-5.0	-0.4	+6.6	+17.5	+25.4	+31.6	+35.2	+47.0	+48.0				
6.0	720	-15.0			-9.9	-7.8	-5.1	-0.1	+7.7	+20.8	+30.2	+35.6	+38.2	+54.0	+55.0				
7.0	720	-16.0			-10.9	-8.5	-5.0	+0.4	+11.3	+24.2	+33.6	+41.1	+45.3	+57.0	+58.0				
8.0	720	-21.0			-10.5	-7.6	-4.2	+2.0	+13.6	+27.2	+37.5	+46.1	+49.0	+73.0	+74.0				
9.0	720	-20.0			-11.3	-8.1	-4.5	+2.2	+15.2	+31.5	+44.0	+51.2	+57.1	+90.0	+91.0				
10.0	720	-25.0			-14.7	-9.9	-4.7	+2.8	+17.5	+36.1	+50.4	+55.5	+59.4	+89.0	+90.0				
11.0	720	-23.0			-13.7	-9.2	-5.8	+3.9	+19.9	+41.0	+53.5	+60.2	+63.6	+86.0	+87.0				
12.0	720	-25.0			-12.3	-9.4	-4.0	+4.3	+23.0	+43.8	+57.0	+62.8	+67.4	+84.0	+85.0				
13.0	720	-24.0			-10.7	-5.8	-1.1	+7.2	+25.2	+45.1	+56.2	+61.7	+65.4	+74.0	+75.0				
14.0	720	-17.0			-8.8	-2.9	-0.1	+8.0	+24.3	+40.3	+51.2	+57.2	+58.9	+74.0	+75.0				
15.0	720	-14.0			-8.2	-1.8	+0.4	+7.7	+21.6	+35.7	+42.8	+47.6	+49.4	+59.0	+60.0				
16.0	720	-13.0			-6.3	-1.6	+0.0	+6.0	+17.3	+29.4	+35.7	+39.3	+42.6	+51.0	+52.0				
17.0	720	-19.0			-7.3	-3.3	-1.3	+3.1	+12.3	+22.7	+30.1	+33.1	+36.4	+43.0	+44.0				
18.0	720	-20.0			-8.6	-4.7	-4.2	-0.1	+7.1	+15.4	+21.5	+25.9	+28.7	+31.5	+32.0				
19.0	720	-14.0			-10.7	-8.6	-6.6	-3.0	+2.2	+10.2	+16.1	+19.8	+23.9	+36.0	+37.0				
20.0	720	-16.0			-11.1	-9.6	-7.8	-4.5	-0.2	+5.6	+10.9	+14.5	+20.8	+25.0	+26.0				
21.0	720	-19.0			-11.6	-10.3	-8.8	-5.9	-1.1	+2.8	+6.8	+9.5	+11.4	+21.0	+22.0				
22.0	720	-15.0			-11.4	-10.5	-9.3	-6.0	-2.4	+1.6	+5.0	+7.2	+6.9	+13.0	+14.0				
23.0	720	-15.0			-12.6	-11.5	-9.8	-7.0	-3.0	+0.7	+4.2	+6.1	+7.4	+11.6	+12.0				
24.0	720	-17.0			-13.9	-13.2	-11.3	-7.6	-2.8	+0.9	+4.6	+6.7	+7.9	+10.0	+11.0				
25.0	720	-21.0			-15.6	-13.6	-11.9	-7.9	-2.7	+1.9	+6.1	+8.2	+9.4	+13.0	+14.0				
26.0	720	-24.0			-17.9	-15.6	-13.0	-8.3	-2.0	+2.9	+7.4	+9.4	+10.4	+15.5	+16.0				
27.0	720	-22.0			-19.3	-15.7	-13.3	-8.2	-1.2	+4.0	+8.1	+10.5	+12.6	+18.0	+19.0				
28.0	9A	-16.1			-18.0	-13.1	-8.4	-4.4	1.4	6.0	13.1	15.0	18.0	19.6	14.7				
29.0	9A	-16.3			-12.0	-12.3	-6.7	2.8	10.3	14.4	16.0	18.0	18.0	19.7	14.9				
30.0	10A	-14.4			-14.0	-12.7	-11.3	-6.4	4.4	9.9	17.4	18.0	20.0	20.4	20.9				
31.0	10A	-19.2			-13.0	-12.4	-10.2	-6.2	4.8	14.0	19.7	20.6	21.0	21.7	21.9				
32.0	10A	-14.4			-13.0	-12.6	-10.3	-5.0	4.0	13.4	18.4	20.4	21.4	26.4	26.5				
33.0	10A	-14.5			-13.5	-13.3	-11.3	-5.6	4.3	14.9	19.2	20.4	23.4	25.4	25.7				
34.0	10A	-14.4			-14.0	-13.6	-10.4	-5.4	4.6	15.7	21.4	24.4	26.4	28.1	28.2				
35.0	110	-17.8			-14.0	-12.5	-10.4	-4.1	3.0	18.0	22.4	25.4	26.4	31.2	31.4				
36.0	112	-21.3			-14.0	-12.5	-10.4	-5.4	4.4	17.7	21.2	21.2	23.4	24.4	24.4				
37.0	112	-22.8			-14.0	-12.4	-10.4	-5.4	5.1	11.6	20.2	21.7	22.4	24.4	24.5				
38.0	114	-29.2			-16.0	-15.7	-12.4	-6.1	4.6	12.2	16.2	20.4	23.0	27.4	27.7				
39.0	112	-25.4			-18.0	-17.5	-11.4	-5.1	5.4	13.0	16.7	25.2	25.4	29.0	29.2				
40.0	112	-26.7			-19.0	-15.7	-12.2	-7.1	4.2	13.4	21.2	24.4	29.0	33.7	33.4				
41.0	113	-24.0			-18.0	-14.2	-12.1	-7.2	3.3	13.1	21.2	30.4	31.0	36.4	36.4				
42.0	112	-24.0			-16.0	-14.2	-12.1	-7.2	3.3	13.1	21.2	30.4	31.0	36.4	36.4				
43.0	112	-24.5			-16.0	-15.6	-13.4	-6.4	2.7	14.1	23.4	32.4	37.0	40.0	40.1				
44.0	111	-20.8			-14.0	-17.4	-11.7	-5.9	4.3	15.4	23.4	34.4	39.4	43.0	43.2				
45.0	110	-14.8			-14.7	-15.7	-11.7	-5.9	4.3	15.4	23.4	34.4	39.4	43.0	43.2				
46.0	107	-21.3			-19.4	-13.0	-11.6	-5.5	5.9	14.3	24.7	39.4	50.4	53.1	53.3				
47.0	105	-14.4			-13.6	-10.0	-5.4	-5.4	6.4	14.3	34.4	42.4	49.0	52.1	52.3				
48.0	103	-16.2			-13.7	-11.4	-6.2	-6.1	4.1	19.4	32.4	45.7	44.0	49.0	50.1				
49.0	101	-15.4			-12.4	-12.4	-5.2	-5.2	6.0	17.4	30.4	45.7	47.0	44.4	44.7				
50.0	100	-16.5			-16.0	-13.7	-10.7	-6.4	6.7	19.0	37.0	45.0	47.0	44.0	44.2				
51.0	100	-15.4			-12.4	-10.7	-6.4	-6.4	6.3	20.0	40.0	46.4	47.0	47.7	47.4				
52.0	9A	-14.9			-13.6	-11.6	-3.9	-7.3	13.3	37.1	45.0	46.5	46.5	46.4	45.9				
53.0	9A	-17.1			-15.6	-11.5	-3.2	-4.0	20.2	34.7	44.0	47.1	47.7	47.4	47.4				
54.0	90	-15.9			-14.2	-11.0	-1.8	-9.7	22.3	34.0	44.2	49.3	50.3	50.4	50.4				
55.0	75	-22.7			-15.3	-10.1	-1.0	-1.0	11.5	24.0	43.3	47.3	51.3	52.2	52.4				
56.0	61	-23.2			-16.6	-7.4	-1.0	-1.0	10.9	25.7	43.3	51.4	52.4	53.1	53.2				
57.0	52	-14.2			-11.4	-7.7	-0.5	-0.5	12.5	28.0	46.4	49.0	50.4	50.4	50.9				
58.0	46	-20.0			-10.0	-9.5	-0.7	-0.7	12.5	27.9	44.4	56.0	76.3	76.5	76.5				
59.0	35	-21.1				-10.2	-2.4	-2.4	15.5	25.7	34.3	53.4	53.4	54.2	54.2				
60.0	25	-22.3				-9.7	-4.0	-4.0	16.5	31.0	41.4	52.4	52.4	52.6	52.6				
61.0	14	-23.4					-8.4	-8.4	3.0	25.4	33.2	33.4	33.4	33.7	33.7				
62.0	4	-12.6					-7.9	-7.9	20.7	48.4	49.0	49.3	49.3	49.3	49.3				
63.0	4	-1.3							40.2	40.2	40.4	40.4	40.4	40.5	40.5				
64.0	4	-12.0							-9.0	-9.0	-9.3	-9.3	-9.3	-9.3	-9.3				
65.0	2	-9.4							-23.0	-1.4	-1.2	-1.2	-1.2	-1.2	-1.2				
66.0	2	-23.2							-4.0	-1.1	-0.9	-0.9	-0.9	-0.7	-0.7				
67.0	2	-4.3							-27.0	-16.1	-15.4	-15.7	-15.7	-15.7	-15.7				
68.0	2	-27.1							-27.0	-21.1	-22.4	-22.7	-22.7	-22.7	-22.7				
69.0	2	-26.8							-27.0	-21.1	-22.4	-22.7	-22.7	-22.7	-22.7				
70.0	2	-31.4							-31.0	-24.5	-24.5	-24.5	-24.5	-24.5	-24.5				

Positive is wind from the tail (240°).

Negative is wind from the head (60°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.5

DATA SOURCE										MAY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-10.0			-7.0	-6.0	-5.5	-3.8	-1.2	+0.8	+2.3	+4.0	+5.7	+6.4	+9.0	
1.0	744	-15.0		-13.4	-11.5	-10.2	-8.3	-5.3	-0.6	+3.7	+8.1	+10.2	+11.5	+17.4	+19.0	
2.0	744	-17.0		-17.4	-12.0	-10.6	-9.6	-5.1	-0.5	+4.9	+9.4	+12.6	+15.5	+18.9	+20.0	
3.0	744	-21.0		-15.4	-12.0	-10.0	-7.2	-4.5	-0.3	+6.0	+12.4	+16.1	+18.2	+22.9	+26.0	
4.0	744	-15.0		-15.4	-11.7	-8.7	-6.8	-4.1	+0.2	+7.1	+14.3	+18.7	+22.5	+25.6	+26.0	
5.0	744	-15.0		-14.4	-10.4	-8.1	-5.4	-3.4	+1.2	+7.0	+15.9	+20.0	+23.2	+26.9	+28.0	
6.0	744	-14.0		-13.4	-10.7	-8.1	-6.5	-2.4	+2.1	+11.0	+18.3	+22.3	+26.1	+30.9	+32.0	
7.0	744	-15.0		-11.5	-8.8	-5.6	-5.6	-2.1	+3.3	+13.6	+21.2	+25.0	+31.2	+35.9	+37.0	
8.0	744	-21.0		-7.4	-12.5	-9.6	-6.6	-1.7	+5.1	+16.1	+23.2	+27.0	+34.5	+37.9	+41.0	
9.0	744	-22.0		-7.4	-14.1	-11.0	-7.3	-1.1	+6.1	+18.5	+26.3	+31.0	+39.7	+43.9	+53.0	
10.0	744	-25.0		-19.4	-15.6	-12.5	-7.9	-1.5	+7.3	+21.0	+31.2	+37.7	+41.0	+49.9	+57.0	
11.0	744	-27.0		-21.4	-18.5	-14.2	-9.2	-1.1	+8.0	+24.9	+36.6	+40.7	+46.7	+55.7	+56.0	
12.0	744	-32.0		-21.4	-19.1	-15.5	-7.6	-0.7	+10.7	+28.3	+39.9	+47.0	+51.5	+65.9	+68.0	
13.0	744	-27.0		-18.3	-15.2	-8.9	-8.9	-0.6	+12.5	+30.7	+41.8	+48.6	+50.9	+60.9	+75.0	
14.0	744	-25.0		-23.4	-14.7	-12.0	-6.3	+0.1	+12.5	+27.3	+38.2	+43.3	+49.5	+57.9	+61.0	
15.0	744	-23.0		-16.4	-13.1	-10.5	-6.7	-0.2	+10.0	+22.3	+30.5	+33.8	+36.6	+41.9	+43.0	
16.0	744	-13.0		-13.1	-9.0	-7.1	-0.0	+7.4	+17.4	+23.2	+25.4	+27.8	+30.9	+32.0	+32.0	
17.0	744	-17.0		-16.7	-11.7	-9.5	-7.4	-3.0	+4.1	+11.2	+18.4	+19.2	+20.6	+23.6	+24.0	
18.0	744	-13.0		-11.5	-10.2	-8.0	-4.5	-0.3	+6.3	+10.4	+13.0	+15.1	+20.4	+21.0	+21.0	
19.0	744	-14.0		-13.4	-11.4	-10.2	-8.8	-5.5	-1.1	+2.6	+6.4	+8.5	+10.2	+13.9	+16.0	
20.0	744	-22.0		-15.4	-11.7	-10.7	-9.3	-6.7	-2.9	+0.5	+3.6	+5.6	+7.1	+10.9	+12.0	
21.0	744	-25.0		-15.4	-12.3	-11.3	-7.4	-7.7	-4.3	+0.0	+1.6	+3.1	+3.3	+9.4	+10.0	
22.0	744	-10.0		-14.4	-12.7	-11.9	-10.9	-9.0	-5.4	-1.2	+0.2	+1.8	+3.8	+9.9	+13.0	
23.0	744	-16.0		-14.8	-13.3	-12.1	-12.1	-9.5	-5.0	-1.9	+0.0	+1.2	+2.7	+10.9	+12.0	
24.0	744	-20.0		-17.4	-16.2	-14.8	-12.4	-10.3	-6.3	-1.9	+0.0	+1.3	+3.8	+5.9	+9.0	
25.0	744	-20.3		-19.4	-16.4	-15.5	-13.4	-10.9	-6.0	-1.5	+0.3	+2.4	+3.8	+7.4	+8.0	
26.0	744	-24.3		-22.4	-18.7	-16.3	-14.5	-11.3	-6.6	-1.4	+0.9	+2.6	+4.1	+7.9	+9.0	
27.0	744	-23.7		-19.3	-13.0	-15.5	-11.4	-6.1	-0.7	+1.4	+2.8	+4.7	+6.9	+8.9	+10.0	
28.0	103	-24.0		-20.0	-18.7	-17.3	-12.1	-6.1	1.3	5.0	5.0	9.0	12.6	12.7		
29.0	104	-22.3		-20.0	-18.4	-16.0	-11.4	-5.4	3.4	5.0	7.3	9.0	9.6	9.7		
30.0	105	-20.3		-18.4	-15.0	-12.4	-8.0	-4.0	4.4	4.4	11.4	12.0	15.0	15.4		
31.0	107	-20.5		-20.0	-18.3	-15.6	-12.3	-4.2	4.3	9.0	11.4	13.0	14.8	14.9		
32.0	110	-22.2		-19.5	-15.2	-11.0	-3.2	4.4	8.4	10.4	11.4	13.4	14.4	14.0		
33.0	112	-21.3		-20.5	-16.4	-12.4	-3.0	5.0	7.7	10.5	13.0	15.2	15.4			
34.0	113	-20.2		-21.2	-16.2	-12.0	-3.4	4.4	9.4	12.5	12.0	14.4	14.7			
35.0	113	-22.3		-21.0	-20.4	-19.1	-12.7	-3.0	4.4	9.7	13.0	15.0	14.7			
36.0	113	-19.4		-14.0	-17.0	-17.1	-13.7	-4.4	4.4	11.4	11.0	12.0	14.0	14.1		
37.0	114	-24.8		-19.0	-19.2	-16.8	-13.0	-5.2	2.3	10.3	14.0	14.0	17.0	17.5		
38.0	112	-20.1		-10.0	-19.2	-16.4	-12.8	-6.3	1.7	9.0	12.0	14.4	15.4	15.5		
39.0	112	-10.6		-10.5	-17.5	-14.2	-7.7	1.1	4.2	11.4	11.4	14.0	20.5	20.5		
40.0	115	-21.1		-19.5	-14.5	-14.5	-9.4	-1.4	5.3	10.4	11.0	14.1	14.3			
41.0	116	-24.5		-21.0	-14.5	-10.5	-3.5	3.4	8.4	9.4	15.4	14.5	14.5			
42.0	116	-24.8		-22.0	-21.7	-16.7	-11.7	-3.7	3.2	13.0	15.4	20.1	20.3			
43.0	113	-21.9		-21.0	-21.4	-19.0	-12.5	-3.0	6.2	9.0	20.0	27.7	27.4			
44.0	112	-27.4		-25.7	-21.4	-20.4	-12.2	-4.5	2.7	7.4	10.9	14.4	14.0			
45.0	111	-32.2		-25.7	-24.7	-21.7	-12.1	-3.3	0.4	4.4	7.0	15.0	15.1			
46.0	108	-31.5		-28.5	-26.0	-20.0	-12.5	-4.1	3.0	4.0	6.0	16.0	17.0			
47.0	107	-41.1		-32.0	-29.4	-26.0	-22.0	-12.7	-3.6	4.7	9.4	9.0	9.4	10.0		
48.0	106	-41.4		-31.0	-29.4	-26.7	-22.7	-13.0	-4.0	2.4	7.4	9.0	9.4	9.4		
49.0	104	-41.8		-34.0	-31.4	-28.3	-23.1	-14.3	-6.3	1.4	4.4	10.0	13.3	13.5		
50.0	100	-42.2		-42.0	-31.7	-30.3	-23.1	-15.0	-6.3	0.0	4.7	6.0	8.0	9.1		
51.0	98	-39.5		-35.4	-30.1	-25.5	-18.5	-6.1	0.1	5.0	7.0	8.0	8.0	8.1		
52.0	95	-39.6		-38.4	-30.7	-26.0	-14.0	-6.3	2.6	7.0	8.1	9.2	9.4			
53.0	90	-41.9		-35.0	-33.2	-26.2	-15.0	-5.3	1.4	8.0	9.1	10.2	10.4			
54.0	85	-45.4		-40.1	-30.9	-24.5	-14.4	-4.2	4.3	9.1	13.1	15.4	15.9			
55.0	74	-58.3		-48.3	-30.3	-23.4	-15.7	-2.7	1.4	3.3	14.3	14.0	15.0			
56.0	66	-52.9		-46.5	-34.4	-26.4	-15.0	-2.7	0.4	8.4	14.2	14.6	14.7			
57.0	57	-43.0		-40.7	-35.1	-28.0	-15.2	-4.0	10.2	11.7	12.4	13.4	13.5			
58.0	43	-48.8		-39.4	-32.2	-17.2	-9.4	-0.4	11.0	20.0	29.3	29.6	29.6			
59.0	33	-39.8		-38.3	-29.0	-16.2	-1.2	8.4	14.0	14.0	14.4	14.4	14.4			
60.0	20	-44.7		-45.0	-32.4	-14.5	5.4	24.0	26.0	26.0	27.0	27.4	27.5			
61.0	12	-49.2			-34.1	-19.0	11.1	17.3	17.3	17.3	17.4	17.7	17.7			
62.0	9	-47.5			-19.5	-12.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4			
63.0	2	-36.7			-37.0	-21.5	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3			
64.0	2	-33.6			-34.0	-32.2	-32.0	-32.0	-32.0	-32.0	-32.0	-32.0	-32.0			
65.0	2	-42.2				-42.0	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6			
66.0	1	-47.2														
67.0	1	-31.6														
68.0	1	-34.8														
69.0	1	-37.8														
70.0	1	-29.1														

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.6

DATA SOURCE											JUNE				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)
SFC	723	-8.0		-6.8	-6.0	-4.8	-2.9	-0.7	+1.0	+2.9	+3.9	+4.7	+9.5	+10.0	
1.0	723	-16.0		-8.9	-8.1	-6.9	-3.8	-0.0	+4.9	+8.6	+10.7	+12.9	+22.5	+23.0	
2.0	723	-9.0		-8.6	-7.2	-6.0	-2.9	+0.4	+5.3	+9.0	+11.3	+13.6	+25.0	+26.0	
3.0	723	-9.0		-7.6	-6.5	-5.3	-2.6	+1.0	+5.6	+8.8	+11.6	+13.9	+25.0	+26.0	
4.0	723	-9.0		-7.2	-6.3	-5.0	-2.4	+1.1	+5.6	+10.1	+13.3	+15.9	+31.0	+32.0	
5.0	723	-12.0		-8.1	-6.6	-5.1	-2.4	+1.0	+6.2	+10.1	+13.4	+16.3	+24.0	+25.0	
6.0	723	-15.0		-8.5	-7.3	-5.9	-2.9	+0.6	+6.7	+11.1	+14.4	+18.8	+22.0	+23.0	
7.0	723	-16.0		-10.4	-8.9	-6.7	-3.3	+1.6	+8.1	+12.4	+15.9	+17.4	+26.0	+27.0	
8.0	723	-14.0		-11.4	-9.8	-7.8	-3.9	+1.9	+9.0	+14.3	+18.3	+20.9	+25.0	+26.0	
9.0	723	-17.0		-13.5	-11.6	-9.2	-4.7	+2.5	+11.0	+16.5	+22.8	+24.6	+29.5	+30.0	
10.0	723	-24.0		-16.9	-14.3	-11.0	-5.5	+2.9	+12.7	+20.0	+25.6	+30.2	+34.0	+35.0	
11.0	723	-33.0		-20.2	-16.9	-13.1	-6.4	+3.5	+14.1	+24.1	+28.6	+34.4	+45.0	+46.0	
12.0	723	-32.0		-23.7	-20.3	-16.0	-7.3	+3.6	+16.7	+29.0	+34.1	+37.9	+51.0	+52.0	
13.0	723	-30.0		-26.2	-22.3	-16.5	-8.0	+4.4	+16.7	+28.6	+35.8	+43.2	+54.0	+55.0	
14.0	723	-30.0		-23.5	-20.8	-16.0	-8.6	+3.0	+13.4	+26.0	+33.3	+37.4	+45.0	+46.0	
15.0	723	-31.0		-20.9	-17.2	-14.5	-3.5	+0.4	+9.4	+18.0	+24.3	+27.6	+36.0	+37.0	
16.0	723	-21.0		-16.6	-14.8	-12.5	-8.2	+0.6	+4.5	+9.7	+14.9	+17.9	+21.5	+22.0	
17.0	723	-23.0		-15.1	-13.3	-10.8	-7.8	-2.7	+1.4	+5.0	+7.3	+8.8	+12.0	+13.0	
18.0	723	-21.0		-14.3	-12.4	-11.6	-8.7	+4.8	+0.8	+1.5	+2.9	+4.4	+5.6	+6.0	
19.0	723	-24.0		-14.7	-13.5	-12.2	-10.1	+6.3	-2.6	-0.6	-0.0	+3.9	+3.3	+4.0	
20.0	723	-23.0		-18.1	-15.6	-14.0	-11.5	+7.8	+4.0	-1.9	-1.1	-0.4	+1.5	+2.0	
21.0	723	-25.0		-17.7	-15.7	-14.4	-12.3	+9.0	-5.7	-3.3	-2.0	-0.3	+1.0	+2.0	
22.0	723	-22.0		-17.9	-16.4	-15.5	-13.4	+10.0	-6.6	-4.5	-3.3	-2.0	+0.0	+1.0	
23.0	723	-22.0		-19.3	-18.4	-16.9	-14.5	+11.1	-7.3	-5.4	-4.0	-2.6	+1.0	+2.0	
24.0	723	-21.0		-19.9	-18.9	-17.9	-15.7	+11.6	-7.7	-5.5	-3.9	-2.7	+0.3	+0.0	
25.0	723	-24.0		-22.1	-20.2	-18.9	-16.5	+12.4	-8.1	-5.7	-4.0	-3.0	-0.4	+0.0	
26.0	723	-25.0		-22.7	-21.5	-19.7	-17.0	+12.0	-8.3	-5.6	-4.1	-2.5	-0.9	+0.0	
27.0	723	-28.0		-23.5	-22.0	-20.3	-17.7	+13.0	-8.0	-5.4	-4.1	-2.6	+0.0	+1.0	
28.0	103	-26.1		-24.0	-22.7	-20.4	-17.0	+13.6	-4.1	-4.1	-0.4	-1.0	3.6	3.7	
29.0	104	-24.5		-24.6	-22.6	-20.9	-16.4	+13.7	-7.0	-4.2	-2.6	-2.0	1.6	1.7	
30.0	107	-26.0		-24.0	-22.6	-21.2	-17.6	+13.6	-7.0	-3.7	-2.6	-2.0	0.1	0.3	
31.0	104	-25.7		-25.6	-23.4	-21.9	-19.2	+13.6	-6.4	-4.3	-3.7	-3.0	-0.3	-0.2	
32.0	104	-26.9		-26.4	-25.6	-23.4	-19.4	+13.0	-5.0	-3.4	-2.6	-1.3	-0.7	-0.5	
33.0	104	-26.6		-25.6	-25.4	-23.6	-20.4	+13.4	-7.1	-3.4	-2.6	-0.1	1.1	1.3	
34.0	110	-30.6		-29.0	-25.7	-22.8	-20.1	+14.1	-4.1	-2.2	-0.4	-1.0	4.0	5.1	
35.0	111	-34.9		-31.0	-29.6	-25.4	-21.2	+15.1	-4.6	-4.1	-1.0	-1.0	-0.6	-0.5	
36.0	110	-31.4		-29.6	-28.6	-25.0	-22.4	+17.4	-10.4	-5.6	-3.4	-2.1	-0.5	-0.4	
37.0	110	-34.7		-34.6	-33.5	-29.2	-26.4	+18.2	-11.0	-8.2	-3.6	-2.1	-0.1	0.0	
38.0	110	-33.9		-33.0	-32.7	-30.9	-26.4	+20.4	-14.1	-10.2	-8.0	-8.0	-7.4	-7.3	
39.0	110	-41.8		-37.0	-36.5	-32.5	-28.1	+22.5	-15.1	-12.2	-10.8	-10.1	-8.4	-8.2	
40.0	110	-47.2		-47.0	-39.6	-35.6	-30.9	+23.6	-17.7	-13.4	-12.4	-11.4	-10.7	-10.6	
41.0	110	-42.9		-40.0	-38.6	-36.6	-33.2	+25.2	-19.5	-15.6	-14.7	-14.0	-11.0	-10.4	
42.0	104	-47.3		-40.0	-39.5	-37.4	-34.3	+26.4	-20.3	-16.1	-15.7	-16.0	-14.2	-14.1	
43.0	104	-46.4		-40.0	-39.8	-38.3	-34.5	+28.3	-21.6	-18.4	-17.6	-16.1	-12.4	-12.3	
44.0	104	-46.5		-41.5	-42.5	-39.4	-34.7	+28.7	-22.3	-18.0	-18.1	-16.1	-13.0	-12.4	
45.0	104	-50.0		-44.0	-42.5	-41.2	-36.3	+30.1	-22.6	-18.2	-17.0	-16.6	-16.2	-16.1	
47.0	107	-44.9		-45.4	-45.4	-42.3	-37.0	+29.6	-23.3	-18.7	-16.2	-15.1	-0.2	-0.1	
48.0	101	-51.2		-47.4	-44.9	-40.9	-37.0	+30.5	-24.3	-19.5	-15.6	-15.0	-13.2	-13.1	
49.0	100	-66.3		-48.7	-45.0	-40.0	-31.0	+31.0	-23.2	-19.0	-17.1	-16.0	-15.0	-14.9	
50.0	92	-50.9		-49.0	-46.2	-41.2	-29.6	+29.6	-21.6	-17.3	-16.0	-16.0	-15.7	-15.7	
51.0	89	-65.6		-48.5	-47.3	-40.0	-30.4	+30.4	-20.4	-15.7	-14.8	-13.0	-13.5	-13.4	
52.0	80	-59.2		-51.2	-48.0	-41.2	-32.0	+32.0	-23.6	-19.0	-18.0	-10.8	-10.0	-9.9	
53.0	75	-63.0		-50.6	-49.7	-43.1	-33.8	+33.8	-23.8	-20.7	-19.4	-12.4	-12.3	-12.2	
54.0	70	-63.7		-51.3	-49.3	-43.4	-34.3	+34.3	-25.2	-20.8	-16.7	-12.7	-12.0	-11.9	
55.0	70	-55.0		-54.4	-50.5	-46.0	-35.5	+35.5	-26.4	-21.6	-18.3	-16.4	-6.6	-6.6	
56.0	66	-54.5		-54.5	-53.6	-45.5	-35.2	+35.2	-27.1	-23.1	-17.5	-16.7	-16.3	-16.2	
57.0	62	-58.0		-55.4	-51.9	-45.1	-32.4	+32.4	-25.9	-17.1	-3.0	3.3	3.6	3.7	
58.0	52	-50.4		-58.4	-54.4	-47.7	-34.3	+34.3	-24.8	-13.6	-6.2	33.3	33.6	33.6	
59.0	40	-60.9		-57.0	-51.7	-45.0	-34.0	+34.0	-22.2	-12.0	-6.0	-4.5	-5.2	-5.2	
60.0	31	-63.3		-61.7	-56.1	-47.5	-37.5	+37.5	-25.9	-11.5	13.2	13.6	13.4	13.4	
61.0	23	-63.3		-60.2	-54.5	-45.0	-35.2	+35.2	-16.2	-9.3	-0.3	-0.3	-0.1	0.0	
62.0	14	-65.8		-57.4	-50.0	-40.0	-30.0	+30.0	-15.0	-6.0	-5.0	-5.7	-5.7	-5.6	
63.0	6	-58.9		-54.0	-48.0	-40.0	-30.0	+30.0	-15.0	-6.0	-5.0	-4.6	-4.6	-4.6	
64.0	2	-67.3		-64.0	-57.0	-45.0	-35.0	+35.0	-25.0	-15.0	-10.0	-10.0	-10.0	-10.0	
65.0	2	-64.1		-64.0	-57.0	-45.0	-35.0	+35.0	-25.0	-15.0	-10.0	-10.0	-10.0	-10.0	
66.0	1	-59.2		-64.0	-57.0	-45.0	-35.0	+35.0	-25.0	-15.0	-10.0	-10.0	-10.0	-10.0	
67.0	1	-60.7		-64.0	-57.0	-45.0	-35.0	+35.0	-25.0	-15.0	-10.0	-10.0	-10.0	-10.0	
68.0	1	-61.3		-64.0	-57.0	-45.0	-35.0	+35.0	-25.0	-15.0	-10.0	-10.0	-10.0	-10.0	

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.8

DATA SOURCE											AUGUST						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-7.0			-4.4	-4.0		-3.5	-2.3	-0.6	+0.8	+2.7	+3.5	+4.6	+7.9	+9.0	
1.3	744	-15.0		-14.9	-9.3	-6.6		-5.3	-3.3	-0.1	+4.4	+7.2	+8.8	+10.8	+17.9	+21.0	
2.0	744	-16.0		-11.9	-9.5	-6.6		-5.3	-2.1	-0.1	+4.7	+7.7	+9.7	+11.3	+16.9	+23.0	
3.0	744	-16.0		-11.9	-7.3	-6.6	-5.6	-2.9	-0.0	+4.9	+8.2	+9.8	+12.3	+15.9	+20.0		
4.0	744	-17.0		-11.9	-8.2	-7.0	-5.8	-3.1	+0.0	+4.9	+8.9	+11.0	+13.5	+17.9	+19.0		
5.0	744	-17.0		-13.9	-9.2	-7.6	-6.1	-3.3	+0.0	+4.9	+9.7	+12.0	+13.7	+17.6	+18.0		
6.0	744	-15.0			-10.2	-4.8	-7.1	-1.0	-0.1	+4.9	+8.9	+11.8	+13.5	+20.9	+22.0		
7.0	744	-17.0		-14.9	-10.9	-9.5	-7.9	-1.6	-0.3	+4.7	+8.9	+11.3	+15.8	+20.4	+21.0		
8.0	744	-18.0			-13.1	-11.0	-9.1	-3.5	-0.8	+4.3	+9.3	+12.0	+13.8	+19.0	+19.0		
9.0	744	-22.0		-17.9	-14.3	-13.0	-11.0	-8.5	-3.7	+4.5	+9.2	+12.4	+14.6	+17.9	+29.0		
10.0	744	-24.0		-25.9	-20.1	-17.0	-13.6	-7.9	-0.7	+5.4	+9.8	+14.5	+17.1	+21.9	+43.0		
11.0	744	-34.0		-32.9	-22.5	-20.2	-15.3	-7.7	-0.9	+6.2	+11.8	+15.5	+17.9	+24.9	+40.0		
12.0	744	-40.0		-35.9	-25.2	-21.3	-18.0	-11.6	-1.1	+7.1	+12.8	+16.6	+19.7	+27.9	+33.0		
13.0	744	-40.0		-17.9	-26.2	-23.0	-18.7	-12.5	-2.1	+7.1	+12.3	+16.5	+20.2	+24.9	+29.0		
14.0	744	-34.0		-33.9	-26.8	-22.3	-17.4	-11.7	-3.1	+5.4	+10.4	+13.8	+16.6	+18.9	+25.0		
15.0	744	-30.0		-29.9	-19.2	-16.5	-13.7	-9.0	-3.5	+2.2	+6.7	+9.2	+11.5	+14.4	+15.0		
16.0	744	-22.0		-20.9	-15.7	-14.0	-11.8	-3.5	-3.9	+0.1	+3.2	+4.7	+5.7	+7.9	+9.0		
17.0	744	-21.0		-14.9	-13.9	-12.7	-11.7	-7.0	-5.4	-1.3	+0.0	+1.1	+2.5	+4.9	+6.0		
18.0	744	-17.0		-15.9	-14.3	-13.9	-12.4	-10.1	-7.0	-4.0	-1.6	-0.7	-0.1	+0.9	+2.0		
19.0	744	-21.0		-17.9	-16.7	-15.3	-14.0	-12.6	-9.4	-6.1	-3.7	-2.9	-1.7	+0.0	+1.0		
20.0	744	-30.0		-21.9	-19.1	-17.0	-14.9	-14.0	-11.3	-8.2	-6.1	-4.9	-3.6	-2.0	-1.0		
21.0	744	-35.0		-23.9	-21.0	-19.3	-17.9	-16.1	-12.0	-9.9	-8.1	-6.8	-5.4	-4.3	-4.0		
22.0	744	-34.0		-24.9	-20.8	-20.2	-19.3	-17.4	-13.6	-11.2	-9.3	-8.4	-7.8	-6.0	-6.0		
23.0	744	-34.0		-24.9	-23.1	-22.0	-20.6	-18.4	-14.7	-11.8	-10.0	-8.6	-7.5	-6.0	-3.0		
24.0	744	-34.0		-24.9	-26.1	-23.3	-21.5	-19.3	-15.0	-12.3	-10.2	-9.3	-8.4	-6.0	-5.0		
25.0	744	-38.0		-29.9	-26.7	-24.6	-22.8	-20.1	-16.4	-13.3	-11.3	-10.3	-9.2	-7.0	-5.0		
26.0	744	-30.0			-27.6	-26.0	-23.7	-20.8	-17.1	-13.4	-11.3	-10.0	-8.4	-7.0	-6.0		
27.0	744	-37.0		-37.9	-28.8	-27.2	-25.1	-21.7	-18.2	-14.0	-11.4	-10.3	-9.4	-8.0	-6.0		
28.0	110	-25.2					-24.9	-22.5	-18.8	-14.1	-12.4	-10.8	-9.1	-7.7	-7.5		
29.0	113	-26.4					-25.8	-23.2	-19.9	-15.0	-13.2	-11.6	-10.1	-8.9	-10.9		
30.0	113	-29.2			-27.0	-26.8	-25.0	-21.4	-17.9	-13.2	-11.6	-10.0	-8.4	-7.5	-10.5		
31.0	115	-41.6			-29.8	-27.8	-26.8	-23.9	-19.2	-13.1	-12.0	-11.1	-10.4	-10.4	-10.3		
32.0	115	-24.6			-28.6	-28.2	-26.4	-24.1	-20.1	-14.7	-11.4	-8.6	-8.1	-7.1	-6.0		
33.0	115	-34.7			-29.8	-28.4	-27.1	-24.0	-19.1	-15.0	-10.9	-10.2	-9.1	-7.9	-7.7		
34.0	117	-29.0			-28.9	-28.2	-27.5	-25.1	-20.1	-15.5	-10.8	-9.7	-8.5	-7.5	-6.5		
35.0	118	-32.9			-32.9	-32.2	-30.6	-25.9	-20.8	-14.7	-10.9	-9.0	-7.2	-6.2	-5.0		
36.0	118	-33.9					-29.1	-27.2	-21.4	-15.0	-11.0	-6.7	-1.2	19.7	19.4		
37.0	120	-33.7			-33.7	-33.4	-32.0	-28.0	-22.7	-14.4	-9.7	-6.0	-5.2	12.2	12.4		
38.0	120	-34.9			-36.8	-35.4	-34.0	-28.4	-22.7	-15.7	-10.9	-6.7	-1.2	9.5	9.6		
39.0	120	-39.2				-38.1	-37.0	-28.7	-21.0	-14.1	-11.0	-6.7	-0.2	2.6	2.8		
40.0	119	-42.0			-39.8	-38.5	-37.0	-31.0	-24.4	-15.4	-12.6	-11.7	-7.9	-5.2	-6.0		
41.0	117	-41.6			-38.8	-37.4	-36.7	-32.4	-25.8	-19.1	-13.4	-9.7	-8.2	-7.4	-7.3		
42.0	117	-42.9			-41.8	-40.1	-39.7	-33.5	-27.4	-20.1	-12.0	-10.7	-9.2	-7.4	-14.8		
43.0	117	-46.4			-45.8	-43.1	-41.1	-37.1	-29.7	-17.9	-11.1	-10.0	-10.3	-9.9	-9.0		
44.0	115	-51.7			-49.0	-48.2	-48.2	-39.8	-29.1	-18.0	-11.2	-7.6	-6.2	-4.6	-4.5		
45.0	114	-55.7			-49.0	-48.0	-45.4	-37.7	-29.5	-17.8	-15.1	-12.6	-10.1	-9.1	-8.9		
46.0	113	-55.9			-47.0	-45.7	-44.4	-39.1	-28.5	-17.5	-15.2	-13.0	-13.1	-10.4	-0.5		
47.0	110	-61.4			-51.0	-47.5	-44.2	-38.4	-28.7	-18.4	-13.5	-11.6	-10.6	-10.1	-10.0		
48.0	110	-54.0			-53.0	-50.5	-46.5	-36.8	-26.7	-19.2	-13.1	-7.9	-7.2	-6.0	-6.4		
49.0	108	-53.4				-52.5	-48.6	-37.4	-27.0	-18.0	-12.7	-10.7	-10.0	-9.1	-9.0		
50.0	105	-55.9			-55.0	-55.1	-46.0	-37.0	-26.4	-17.5	-12.1	-6.1	-5.1	-1.6	-1.5		
51.0	105	-71.5			-48.0	-47.6	-45.4	-39.8	-26.4	-14.3	-9.1	0.6	2.0	6.0	5.2		
52.0	98	-85.1				-49.8	-46.8	-38.2	-25.1	-15.2	-8.0	-1.9	93.0	93.8	93.0		
53.0	96	-64.8				-55.8	-49.2	-39.0	-28.5	-12.1	-6.1	-1.1	4.0	5.0	5.1		
54.0	91	-67.6				-53.0	-49.2	-40.2	-25.2	-0.4	2.5	7.0	10.1	10.7	10.4		
55.0	83	-61.2				-59.1	-46.8	-36.8	-24.8	-8.2	1.0	11.1	15.1	15.4	15.7		
56.0	74	-66.1				-53.1	-49.2	-39.1	-28.2	-5.0	10.1	14.1	20.2	20.6	20.7		
57.0	61	-62.4				-51.4	-47.0	-35.1	-24.8	-3.7	5.0	19.8	20.6	21.2	21.1		
58.0	48	-65.5				-50.0	-42.8	-32.8	-18.0	8.4	15.6	18.0	23.6	24.1	24.2		
59.0	37	-66.4					-44.1	-31.1	-6.5	9.1	27.2	47.0	47.0	48.3	48.4		
60.0	27	-42.8					-41.6	-33.7	-8.5	8.7	10.7	24.6	25.1	25.4	25.5		
61.0	27	-44.9					-46.6	-35.7	-5.7	12.7	14.7	31.0	31.7	31.0	32.0		
62.0	13	-42.8					-35.0	-35.7	-4.7	14.0	19.0	19.6	19.7	19.8	19.8		
63.0	16	-54.2						-35.5	-12.0	7.5	24.1	24.0	24.5	24.6	24.6		
64.0	10	-27.5						-22.0	-15.0	4.4	23.6	24.0	24.2	24.3	24.3		
65.0	4	-41.7						-25.7	-14.0	-4.3	15.0	15.0	16.4	16.5	16.5		
66.0	7	-34.3						-11.7	-0.1	13.7	13.0	14.0	14.1	14.1	14.1		
67.0	6	-45.5						-10.0	-7.0	-6.0	-6.1	-6.2	-6.2	-6.2	-6.2		
68.0	5	-31.5						-16.5	-5.7	-8.2	-8.7	-8.6	-8.5	-8.5	-8.5		
69.0	4	-21.2						-17.0	-3.6	-3.1	-3.0	-2.9	-2.9	-2.9	-2.9		
70.0	4	-19.6						-19.0	14.4	14.0	15.0	15.0	15.1	15.1	15.1		

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.9

DATA SOURCE											SEPTEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-15.0			-10.7	-8.6	-6.7	-4.3	-1.4	0.0	+2.4	+3.9	+5.0	+12.0	+13.0	
1.0	720	-23.0			-16.3	-13.0	-10.7	-7.0	-1.4	+2.4	+7.4	+13.2	+17.7	+26.0	+27.0	
2.0	720	-22.0			-14.6	-11.7	-8.9	-5.9	-0.4	+4.1	+9.6	+14.7	+18.0	+35.0	+36.0	
3.0	720	-22.0			-12.7	-9.0	-5.0	-1.1	-0.5	+5.0	+11.0	+14.0	+17.7	+39.0	+40.0	
4.0	720	-23.0			-12.3	-8.4	-4.3	-1.0	-0.4	+5.0	+12.0	+14.0	+18.7	+35.0	+36.0	
5.0	720	-27.0			-11.7	-10.1	-7.5	-4.7	-0.3	+6.1	+13.3	+16.2	+19.4	+33.0	+34.0	
6.0	720	-30.0			-13.3	-10.0	-6.4	-3.2	-0.1	+7.0	+12.0	+15.3	+18.7	+24.0	+25.0	
7.0	720	-31.0			-15.3	-11.5	-8.1	-4.4	+0.0	+7.3	+13.0	+17.3	+20.0	+25.5	+26.0	
8.0	720	-23.7			-18.3	-12.7	-9.5	-5.4	+0.2	+8.0	+15.5	+18.9	+22.4	+29.0	+30.0	
9.0	720	-27.3			-15.7	-12.6	-10.0	-6.0	+1.0	+10.7	+18.0	+21.5	+23.9	+33.0	+34.0	
10.0	720	-24.3			-14.3	-15.1	-11.0	-6.5	+1.4	+12.3	+20.0	+24.1	+26.1	+34.0	+35.0	
11.0	720	-27.0			-21.6	-16.7	-13.2	-7.0	+2.5	+13.9	+22.0	+26.1	+27.6	+35.0	+36.0	
12.0	720	-23.0			-21.3	-17.4	-14.4	-7.5	+3.7	+14.9	+23.2	+27.1	+27.9	+36.0	+37.0	
13.0	720	-27.0			-21.7	-19.1	-15.5	-7.9	+3.3	+15.1	+23.3	+28.1	+27.4	+40.0	+41.0	
14.0	720	-27.0			-21.2	-18.7	-16.1	-8.3	+1.0	+13.2	+20.3	+22.7	+25.7	+30.0	+31.0	
15.0	720	-24.0			-20.3	-16.0	-13.3	-7.9	+0.3	+9.2	+14.3	+16.9	+13.4	+21.0	+22.0	
16.0	720	-24.0			-17.3	-14.8	-11.4	-6.0	-0.4	+4.9	+9.7	+11.9	+12.9	+21.0	+22.0	
17.0	720	-20.0			-14.9	-12.0	-10.7	-7.4	-2.2	+2.2	+6.0	+7.3	+9.2	+13.5	+14.0	
18.0	720	-21.0			-13.7	-12.5	-11.0	-8.2	-3.5	-0.1	+3.0	+4.8	+6.5	+9.0	+10.0	
19.0	720	-20.0			-13.9	-12.9	-11.3	-9.6	-5.0	-1.6	+0.2	+1.7	+3.2	+6.0	+7.0	
20.0	720	-21.0			-16.2	-15.2	-13.2	-11.1	-7.0	-3.3	-0.4	-0.1	+0.4	+3.5	+4.0	
21.0	720	-20.0			-16.5	-15.4	-14.2	-11.8	-8.3	-5.0	-2.6	-1.3	-1.5	-0.0	+0.0	
22.0	720	-19.0			-17.6	-16.2	-15.1	-12.4	-9.5	-6.3	-4.0	-2.9	-1.7	-0.4	+0.0	
23.0	720	-22.0			-18.3	-17.4	-15.9	-13.7	-10.2	-6.7	-4.8	-3.7	-3.0	-0.2	+0.0	
24.0	720	-24.0			-19.7	-18.5	-16.9	-14.3	-10.4	-7.2	-5.0	-3.5	-1.7	+1.5	+2.0	
25.0	720	-22.0			-20.3	-19.4	-17.7	-15.3	-11.5	-7.6	-4.8	-3.2	-2.1	+2.0	+3.0	
26.0	720	-27.0			-21.0	-20.5	-19.2	-16.0	-11.7	-7.1	-4.0	-3.3	-2.1	+1.0	+2.0	
27.0	740	-25.0			-22.3	-21.1	-19.5	-16.9	-11.7	-7.2	-4.8	-3.1	-1.9	+2.0	+3.0	
28.0	105	-25.8			-21.0	-20.3	-18.9	-16.1	-11.0	-5.7	-2.8	-0.4	0.0	2.5	2.6	
29.0	107	-25.6			-22.0	-21.4	-19.0	-16.7	-11.4	-6.1	-2.8	-1.0	-0.1	0.4	0.5	
30.0	104	-24.0			-21.0	-20.3	-18.3	-15.0	-10.0	-5.3	-2.1	-0.5	0.0	1.0	2.0	
31.0	104	-21.9			-21.0	-21.3	-19.6	-14.9	-9.0	-4.5	-0.3	0.0	2.0	3.5	3.5	
32.0	104	-23.4			-21.0	-20.5	-17.5	-14.1	-9.2	-4.8	-0.1	2.8	5.0	6.9	7.1	
33.0	104	-19.1			-18.0	-17.8	-16.0	-14.0	-9.1	-4.1	1.8	5.6	6.0	9.3	9.5	
34.0	104	-19.9			-19.0	-18.3	-16.6	-14.5	-9.2	-1.5	4.3	6.6	7.0	9.1	9.3	
35.0	104	-24.0			-23.0	-20.5	-17.8	-14.0	-7.8	-0.6	4.3	5.8	6.0	10.7	10.4	
36.0	104	-25.1			-24.0	-18.4	-17.6	-14.0	-7.2	-1.0	2.5	4.8	6.0	7.5	7.6	
37.0	107	-26.1			-23.0	-22.4	-18.3	-14.8	-6.7	-0.9	3.3	5.6	6.3	9.6	9.7	
38.0	106	-25.6			-22.0	-21.0	-20.0	-15.3	-9.5	-1.3	3.4	5.6	6.0	9.7	9.4	
39.0	106	-21.7			-24.7	-23.4	-20.0	-15.4	-9.2	-1.5	2.7	7.6	9.7	10.3	10.4	
40.0	106	-24.0			-24.0	-23.3	-21.2	-16.4	-9.0	-0.8	2.6	4.6	5.0	7.3	7.5	
41.0	102	-26.9			-26.0	-25.8	-23.7	-18.3	-7.0	-0.5	4.0	4.7	10.0	12.5	12.6	
42.0	102	-34.4			-29.0	-25.0	-24.9	-19.0	-9.0	-0.4	2.0	3.8	7.0	12.0	12.1	
43.0	100	-36.0			-36.0	-28.7	-27.0	-21.8	-9.0	0.0	5.0	5.0	8.0	11.8	11.9	
44.0	99	-37.3				-34.7	-30.0	-17.6	-7.1	0.3	5.4	6.3	6.0	7.2	7.3	
45.0	95	-34.2				-27.8	-23.2	-14.0	-6.0	1.0	5.4	7.0	10.1	10.9	11.0	
46.0	94	-32.0				-23.0	-20.6	-15.0	-5.8	3.0	5.0	7.0	16.1	17.3	17.4	
47.0	86	-27.3				-23.5	-21.7	-13.4	-5.0	3.1	9.7	18.0	16.1	16.7	15.8	
48.0	85	-26.2				-20.7	-18.0	-15.1	-4.7	4.1	9.0	19.1	15.9	16.1	15.3	
49.0	83	-25.5				-24.6	-18.0	-12.0	-3.0	6.0	9.0	19.1	15.9	16.1	15.3	
50.0	81	-25.0				-22.2	-16.5	-13.6	-2.5	7.5	14.5	20.0	21.3	22.3	22.5	
51.0	75	-21.1				-22.3	-21.1	-15.5	-1.3	10.0	16.1	19.3	21.2	21.8	21.9	
52.0	66	-24.4				-22.5	-21.3	-16.3	-1.0	9.4	13.0	19.5	20.5	21.4	21.5	
53.0	61	-26.0				-20.6	-18.6	-12.8	1.4	10.7	18.6	19.5	20.0	20.8	20.5	
54.0	54	-23.8				-18.8	-18.1	-11.4	5.5	12.4	18.1	21.7	31.5	32.2	32.3	
55.0	46	-14.8					-16.2	-9.6	4.8	13.4	20.3	23.7	37.4	38.2	38.2	
56.0	37	-10.3					-13.7	-7.0	4.5	15.7	19.7	22.0	22.8	23.4	23.5	
57.0	37	-10.3						-9.0	5.1	13.6	22.1	22.5	22.7	22.9	22.9	
58.0	31	-10.1					-9.4	-1.1	11.5	21.0	23.7	24.2	24.4	24.6	24.7	
59.0	20	-11.8					-12.0	-3.8	10.0	20.8	25.0	24.3	24.5	24.6	24.6	
60.0	12	-11.7						-10.5	7.0	31.5	34.5	34.0	35.0	35.2	35.2	
61.0	8	-16.7						-14.7	6.0	17.7	46.6	46.0	47.0	47.0	47.0	
62.0	6	-22.3							-19.0	29.0	29.4	29.5	29.5	29.6	29.6	
63.0	6	-24.8							-19.0	49.0	42.6	42.6	42.6	42.6	42.6	
64.0	2	-8.0							-8.0	-0.3	0.0	0.0	0.1	0.1	0.1	
65.0	1	10.8														
66.0	1	11.2														
67.0	1	6.0														
68.0	1	1.3														
69.0	1	-0.5														
70.0	1	1.2														

Positive is wind from the tail (240°).
Negative is wind from the head (60°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.10

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5.0	744	-15.0	-14.7	-9.7	-8.5	-6.9	-4.5	-1.2	+0.5	+1.9	+3.1	+4.6	+5.9	+14.0		
1.0	744	-17.0	-17.7	-14.3	-13.3	-11.6	-8.2	-2.4	+2.9	+7.3	+10.2	+13.2	+17.4	+18.0		
2.0	744	-18.0	-18.7	-16.7	-15.6	-11.7	-9.4	-5.9	-0.3	+5.7	+9.9	+13.8	+15.7	+22.4	+23.0	
3.0	744	-17.0	-15.9	-12.7	-9.7	-7.4	-3.9	+1.1	+7.2	+12.4	+16.2	+17.4	+24.9	+26.0		
4.0	744	-15.0	-9.7	-7.7	-5.9	-2.3	+2.5	+9.0	+13.9	+18.5	+22.3	+28.9	+32.0			
5.0	744	-17.0	-9.7	-7.0	-5.4	-2.1	+4.1	+11.2	+16.1	+21.5	+26.5	+33.9	+36.0			
6.0	744	-15.0	-7.7	-5.6	-3.7	+3.6	+13.2	+19.8	+23.0	+28.6	+38.9	+49.0				
7.0	744	-13.0	-10.5	-7.4	-5.3	-1.5	+7.2	+16.3	+22.9	+28.0	+32.5	+42.9	+61.0			
8.0	744	-15.0	-10.5	-8.0	-6.5	+0.1	+9.2	+19.6	+26.9	+32.0	+36.7	+46.9	+64.0			
9.0	744	-16.0	-15.9	-10.5	-7.2	-4.5	+0.4	+11.2	+23.1	+32.9	+39.8	+43.1	+52.9	+80.0		
10.0	744	-17.0	-16.7	-12.2	-8.0	-4.5	+0.2	+13.3	+26.4	+37.7	+43.0	+47.5	+64.9	+78.0		
11.0	744	-17.0	-15.9	-13.2	-8.6	-3.9	+0.7	+15.1	+30.5	+41.3	+45.7	+50.3	+70.9	+72.0		
12.0	744	-13.0	-15.9	-11.5	-8.0	-4.8	+1.7	+16.0	+33.3	+41.7	+46.3	+52.5	+67.9	+73.0		
13.0	744	-10.0	-13.9	-10.3	-4.9	-4.9	+1.7	+16.8	+32.4	+41.2	+44.2	+47.1	+55.9	+65.0		
14.0	744	-12.0	-9.3	-7.3	-4.6	+1.0	+14.9	+28.3	+35.6	+39.0	+42.1	+48.4	+49.0			
15.0	744	-11.0	-11.7	-7.5	-6.0	-3.6	+1.1	+12.4	+22.4	+28.6	+33.8	+36.2	+44.9	+47.0		
16.0	744	-13.0	-11.7	-8.1	-5.0	-3.2	+0.1	+8.1	+16.2	+23.1	+26.8	+31.2	+35.9	+39.0		
17.0	744	-13.0	-9.7	-6.9	-5.7	-3.9	+1.3	+9.0	+10.9	+17.1	+22.0	+25.6	+30.9	+32.0		
18.0	744	-7.0	-4.7	-4.3	-6.5	-5.4	-2.1	+0.3	+6.4	+11.1	+15.7	+20.5	+25.9	+30.0		
19.0	744	-11.0	-9.3	-7.6	-6.8	-4.5	-3.0	+2.9	+7.3	+10.8	+13.1	+23.9	+28.0			
20.0	744	-12.0	-11.7	-9.7	-8.7	-7.4	-5.3	-2.0	+1.1	+5.1	+7.5	+10.1	+17.9	+23.0		
21.0	744	-11.0	-11.7	-10.2	-9.6	-8.6	-6.6	-2.6	+0.2	+3.4	+6.0	+7.7	+15.4	+16.0		
22.0	744	-13.0	-12.7	-11.5	-10.5	-9.2	-7.0	-3.4	+0.1	+2.7	+4.6	+6.5	+9.9	+11.0		
23.0	744	-17.0	-14.7	-13.3	-11.9	-10.0	-7.6	-3.7	+0.2	+2.6	+4.8	+6.5	+8.6	+9.0		
24.0	744	-14.0	-13.7	-12.4	-11.4	-10.4	-7.9	-3.5	+0.0	+3.0	+5.4	+7.5	+10.4	+11.0		
25.0	744	-13.0	-13.7	-11.6	-10.6	-10.6	-7.7	-3.4	+0.5	+4.1	+6.2	+8.7	+10.4	+11.0		
26.0	744	-13.0	-13.7	-12.7	-11.4	-10.4	-7.4	-2.7	+2.1	+5.5	+8.0	+9.3	+10.9	+12.0		
27.0	744	-13.0	-14.5	-12.9	-11.2	-10.2	-7.1	-2.2	+3.1	+6.9	+9.2	+11.1	+12.9	+15.0		
28.0	74	-10.1	-12.7	-12.0	-10.7	-9.5	-7.3	-0.2	+5.7	+9.5	+10.2	+11.5	+11.5			
29.0	82	-15.4	-11.7	-10.9	-9.8	-8.4	-6.8	1.7	7.5	11.0	12.0	12.4	13.1	13.1		
30.0	84	-10.6	-9.1	-8.0	-6.9	-5.7	1.0	4.8	13.5	14.1	20.2	21.3	21.5			
31.0	85	-14.7	-12.1	-10.7	-9.4	-8.4	3.1	10.7	16.4	20.0	20.3	21.4	21.5			
32.0	90	-17.4	-12.0	-10.5	-9.4	-8.5	5.0	11.5	18.5	20.0	25.1	25.9	26.1			
33.0	90	-0.4	-9.0	-7.7	-6.7	-5.7	5.7	13.9	20.4	23.0	32.1	32.7	32.4			
34.0	90	-8.8	-7.0	-5.5	-4.5	-3.2	7.6	18.2	23.3	25.0	27.1	27.7	27.4			
35.0	90	-12.1	-11.0	-7.5	-5.2	-4.4	8.4	20.7	25.5	29.0	35.1	37.4	37.5			
36.0	91	-16.3	-9.0	-8.1	-6.4	-5.5	21.2	26.2	30.0	31.7	32.3	32.3				
37.0	90	-18.6	-15.0	-10.5	-8.4	-8.2	25.1	29.3	31.0	34.1	35.0	35.1				
38.0	89	-17.3	-10.0	-6.4	-3.7	0.8	25.4	32.5	34.5	37.1	38.2	38.3				
39.0	94	-10.4	-7.4	-5.8	-1.8	11.3	31.4	37.4	39.0	40.5	40.9	40.9				
40.0	95	-8.3	-6.8	-5.1	0.4	15.1	33.5	42.1	43.8	45.0	45.7	45.8				
41.0	94	-7.0	-6.9	-4.2	2.0	16.3	34.1	44.7	46.0	50.1	50.7	50.9				
42.0	97	-8.7	-7.9	-7.0	4.4	17.2	35.6	47.1	51.4	55.0	55.9	56.1				
43.0	97	-11.0	-7.8	-4.1	5.1	19.4	36.5	52.1	53.0	57.0	57.4	57.5				
44.0	94	-11.5	-8.0	-3.1	5.5	19.8	40.0	47.3	54.0	60.7	61.2	61.3				
45.0	92	-11.7	-8.0	-0.4	5.3	21.4	42.4	52.7	59.0	62.1	63.1	63.1				
46.0	93	-15.5	-5.9	0.3	8.4	25.0	46.5	54.4	57.0	65.0	65.6	65.6				
47.0	91	-13.6	-8.0	-2.5	8.2	29.3	45.4	53.7	60.0	64.1	64.7	64.8				
48.0	82	-3.6	1.0	4.5	10.1	29.3	48.5	59.5	53.0	76.1	76.5	76.5				
49.0	84	0.3	1.5	4.7	10.3	32.0	50.4	62.7	72.0	83.2	84.1	84.3				
50.0	84	1.8	2.5	3.5	12.4	33.5	53.8	64.4	76.1	89.7	89.7	89.4				
51.0	74	1.6	4.5	13.3	32.8	50.7	67.1	80.2	81.1	91.4	91.4	91.4				
52.0	74	0.6	3.0	15.4	35.4	57.1	72.1	82.4	92.2	92.6	92.6	92.7				
53.0	70	1.3	3.4	15.4	35.5	58.0	72.5	75.4	81.4	91.9	91.9	91.9				
54.0	65	2.1	5.2	17.3	40.5	58.7	70.9	74.4	76.4	76.9	76.9	76.9				
55.0	57	2.0	3.3	18.0	37.5	56.0	70.5	76.7	81.4	81.4	81.4	81.4				
56.0	48	1.8	2.1	14.4	37.5	56.4	73.5	76.4	76.7	76.4	76.4	76.4				
57.0	40	3.8	6.0	13.3	39.5	54.8	72.0	80.1	80.7	81.1	81.1	81.1				
58.0	34	0.5	2.7	11.4	37.0	53.5	68.3	71.3	71.4	71.4	71.4	71.4				
59.0	27	-5.9	7.4	13.3	36.5	55.7	62.7	73.3	73.6	73.6	73.6	73.9				
60.0	22	-7.9	-0.9	11.5	35.0	57.5	61.0	74.4	74.0	74.0	74.0	74.2				
61.0	14	5.3	24.2	42.0	57.8	83.4	84.4	84.4	84.4	84.4	84.4	84.5				
62.0	4	27.0	38.0	62.4	63.0	63.0	63.1	63.1	63.1	63.1	63.1	63.1				
63.0	2	24.9	29.0	74.4	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1				
64.0	1	32.3														
65.0	1	42.7														
66.0	1	24.3														
67.0	1	15.4														
68.0	1	4.6														
69.0	1	8.2														
70.0	1	22.5														

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.11

DATA SOURCE										NOVEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5.0	720	-9.0		-7.5	-6.7	-5.8		-3.2	-0.7	+0.8	+2.4	+3.3	+5.3	+8.0	+9.0		
1.0	720	-19.0		-14.5	-11.6	-10.3		-7.4	-1.4	+5.4	+10.6	+12.6	+14.5	+21.0	+22.0		
2.0	720	-22.0		-12.3	-10.4	-8.5		-4.8	+0.3	+7.4	+13.8	+16.8	+21.8	+31.0	+32.0		
3.0	720	-21.0		-10.3	-8.0	-5.8	-2.7	+2.0	+10.4	+17.6	+20.6	+23.4	+31.0	+32.0			
4.0	720	-13.0		-9.7	-8.1	-5.5	-1.0	+3.8	+12.0	+19.7	+24.1	+28.5	+35.0	+36.0			
5.0	720	-11.0		-8.9	-7.4	-4.6	-0.5	+6.3	+15.3	+23.2	+29.3	+30.7	+39.0	+40.0			
6.0	720	-12.0		-10.3	-7.5	-4.2	+0.5	+8.5	+18.8	+27.4	+32.3	+37.8	+44.5	+45.0			
7.0	720	-13.0		-10.7	-6.4	-3.5	+1.4	+11.2	+22.0	+31.0	+37.4	+40.9	+44.5	+45.0			
8.0	720	-19.0		-11.7	-7.1	-2.7	+2.7	+13.5	+25.3	+36.5	+42.5	+46.4	+53.0	+54.0			
9.0	720	-23.0		-13.3	-7.6	-2.8	+4.4	+15.8	+29.3	+41.0	+46.8	+50.6	+53.0	+54.0			
10.0	720	-25.0		-13.7	-9.3	-4.3	+5.2	+17.8	+32.8	+46.0	+53.9	+57.8	+62.0	+63.0			
11.0	720	-25.0		-15.3	-3.9	-3.0	+6.7	+21.4	+36.2	+50.3	+58.5	+65.8	+67.0	+68.0			
12.0	720	-23.0		-16.2	-10.3	-3.0	+7.0	+23.6	+38.2	+50.6	+62.7	+66.8	+75.0	+76.0			
13.0	720	-17.0		-14.3	-6.8	-2.0	+8.2	+24.5	+36.9	+49.0	+55.6	+65.8	+71.0	+72.0			
14.0	720	-17.0		-12.7	-5.2	+0.5	+9.4	+21.0	+34.6	+43.2	+48.6	+58.8	+71.0	+72.0			
15.0	720	-23.0		-15.4	-7.1	+0.0	+8.1	+17.4	+28.6	+36.4	+39.9	+46.8	+57.0	+58.0			
16.0	720	-17.0		-7.3	-3.1	+0.4	+8.3	+15.0	+23.5	+29.2	+33.3	+35.4	+49.0	+50.0			
17.0	720	-11.0		-7.0	-4.1	-1.2	+3.4	+10.0	+18.1	+23.7	+26.8	+27.3	+36.5	+37.0			
18.0	720	-11.0		-7.5	-5.6	-3.2	+0.8	+6.8	+13.2	+17.7	+19.5	+22.4	+28.0	+29.0			
19.0	720	-11.0		-7.4	-5.6	-4.0	+0.6	+4.0	+8.8	+13.8	+16.5	+20.2	+27.0	+28.0			
20.0	720	-7.0		-7.5	-6.3	-4.5	-1.4	+1.4	+6.4	+11.7	+14.2	+18.6	+24.0	+25.0			
21.0	720	-14.0		-8.1	-6.8	-5.4	-2.1	+1.4	+6.3	+10.8	+13.5	+17.2	+27.0	+28.0			
22.0	720	-13.0		-9.1	-7.2	-5.7	-2.4	+1.4	+6.8	+10.4	+14.9	+17.4	+27.5	+28.0			
23.0	720	-19.0		-9.5	-7.7	-6.0	-2.0	+2.4	+7.4	+12.4	+15.7	+17.9	+27.5	+28.0			
24.0	720	-23.0		-10.0	-8.1	-6.4	-1.7	+3.0	+9.4	+13.8	+16.1	+17.8	+23.0	+24.0			
25.0	720	-17.0		-10.1	-4.5	-2.1	-1.5	+3.0	+11.3	+15.7	+17.4	+20.9	+28.0	+29.0			
26.0	720	-14.0		-11.5	-7.7	-6.5	-0.9	+8.4	+13.1	+17.7	+19.4	+21.7	+27.0	+28.0			
27.0	720	-23.0		-13.2	-7.3	-6.3	-0.2	+8.2	+15.2	+19.5	+21.4	+23.6	+29.0	+30.0			
28.0	89	-9.2		-4.0	-1.5	1.4	10.4	13.0	24.4	25.4	27.1	29.1	29.1	29.1			
29.0	90	-9.1		-8.0	-3.5	4.4	15.0	22.0	29.5	29.5	33.1	33.6	33.6	33.6			
30.0	90	-9.9		-7.0	-1.7	6.4	17.4	25.0	31.4	31.4	34.4	35.0	35.0	35.0			
31.0	91	-16.0		-8.0	0.5	7.4	19.5	27.4	32.5	32.5	38.0	36.1	37.1	37.2			
32.0	91	-9.3		0.1	2.5	9.4	20.9	31.1	35.0	31.1	35.0	39.1	39.6	39.6			
33.0	92	-14.7		-2.0	2.4	12.0	23.0	38.4	38.4	41.0	41.0	44.1	44.6	44.7			
34.0	92	-14.6		0.1	3.4	14.5	26.2	35.7	39.4	44.0	44.1	47.4	47.4	47.7			
35.0	92	-14.4		4.1	6.4	15.4	28.0	30.5	46.2	49.4	50.1	50.7	50.8	50.8			
36.0	90	-20.2		6.0	7.4	16.4	27.7	33.4	47.5	51.4	53.1	54.0	54.1	54.1			
37.0	91	-22.7		7.1	8.4	17.4	29.0	43.1	51.2	52.0	59.1	60.2	60.4	60.4			
38.0	94	-10.2		2.2	11.4	19.0	34.5	46.5	53.1	55.0	65.1	66.4	66.5	66.5			
39.0	94	-6.7		5.1	13.7	20.5	35.4	50.0	54.7	57.0	67.1	68.1	68.1	68.1			
40.0	94	-1.7		12.1	13.4	22.0	38.2	51.5	59.5	60.0	69.1	70.0	70.1	70.1			
41.0	93	-0.2		12.1	14.3	24.4	40.4	53.2	60.4	62.0	70.1	71.0	71.2	71.2			
42.0	93	-1.0		13.1	14.7	26.4	43.1	57.4	65.2	67.0	71.1	72.1	72.2	72.2			
43.0	92	-0.1		13.1	14.6	30.4	46.5	63.1	70.7	72.0	73.4	74.1	74.2	74.2			
44.0	84	0.4		16.5	20.4	33.4	51.4	64.0	74.4	85.0	85.5	85.4	85.4	85.4			
45.0	87	0.6		11.0	26.4	35.0	56.5	70.5	84.7	93.4	94.1	94.8	94.8	94.8			
46.0	86	4.8		15.0	27.4	39.5	58.0	76.4	94.7	99.0	102.0	103.4	103.4	103.4			
47.0	83	2.2		20.0	28.2	43.2	61.4	80.0	96.4	102.1	105.2	105.0	105.0	105.0			
48.0	82	2.6		21.0	33.1	45.4	65.0	86.0	96.0	102.1	104.2	104.0	104.0	104.0			
49.0	85	5.0		27.0	37.4	46.5	68.4	86.4	95.4	105.1	107.2	104.0	104.1	104.1			
50.0	94	6.9		28.0	35.2	47.4	72.0	84.7	94.4	104.1	114.2	114.0	114.0	114.0			
51.0	77	7.9		26.4	31.9	48.4	60.4	91.4	100.2	102.0	104.1	104.5	104.5	104.5			
52.0	74	6.5		26.7	30.7	50.0	87.4	94.4	100.7	102.4	104.4	104.4	104.4	104.4			
53.0	70	4.4		26.4	29.4	50.4	71.0	84.4	94.4	104.7	110.2	110.7	110.4	110.4			
54.0	61	1.3		28.4	30.1	49.0	76.5	94.4	101.0	111.4	114.4	114.4	114.4	114.4			
55.0	52	0.8		25.2	26.4	51.1	74.0	91.4	101.4	102.8	111.4	111.4	111.4	111.4			
56.0	47	2.7		22.1	29.4	51.5	70.5	95.4	100.4	105.4	104.4	104.4	104.4	104.4			
57.0	45	6.7		24.0	26.4	51.1	74.5	94.4	99.4	104.0	104.4	104.4	104.4	104.4			
58.0	38	24.4			26.0	51.0	69.5	91.7	100.4	111.2	111.7	112.1	112.1	112.1			
59.0	29	20.6			41.5	54.4	72.4	92.2	105.4	104.4	107.0	107.4	107.4	107.4			
60.0	21	36.8			39.1	67.1	74.4	96.4	94.0	111.4	111.4	112.0	112.0	112.0			
61.0	16	30.2				46.5	72.0	89.5	114.2	114.7	114.0	115.1	115.1	115.1			
62.0	15	34.1				52.4	72.5	84.6	114.2	114.4	114.4	114.7	114.7	114.7			
63.0	11	27.9				48.4	65.5	80.3	96.4	96.7	96.4	96.4	96.4	96.4			
64.0	7	41.9				48.1	58.5	87.0	93.0	94.0	94.4	94.4	94.4	94.4			
65.0	6	46.8					56.0	81.1	81.4	82.0	82.1	82.2	82.2	82.2			
66.0	4	47.0					48.0	71.2	71.4	71.4	71.4	71.4	71.4	71.4			
67.0	4	14.5					31.0	57.2	57.4	57.4	57.4	57.4	57.4	57.4			
68.0	4	7.9					25.0	87.4	87.0	88.1	88.1	88.2	88.2	88.2			
69.0	3	-17.4					28.5	71.4	71.7	71.0	71.4	71.4	71.4	71.4			
70.0	2	-35.9					-36.0	94.4	95.1	95.1	95.2	95.2	95.2	95.2			

Positive is wind from the tail (240°).
Negative is wind from the head (60°).

HEAD AND TAIL WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 6.12

DATA SOURCE											DECEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA		EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	794	-3.0			-6.0	-4.0	-4.2	-2.3	-0.1	+1.1	+2.9	+4.1	+5.3	+8.4	+9.0	
1.0	794	-10.0			-12.5	-11.1	-9.5	-5.8	-0.0	+6.7	+11.3	+13.6	+14.8	+18.7	+22.0	
2.0	794	-11.0		-13.7	-10.1	-8.5	-6.2	-2.3	+2.7	+7.9	+15.8	+18.7	+21.8	+30.9	+34.0	
3.0	794	-18.0		-11.9	-7.6	-5.4	-3.6	-0.6	+5.0	+13.1	+19.7	+22.7	+25.8	+32.9	+34.0	
4.0	794	-13.0		-9.9	-4.9	-4.1	-2.3	+0.7	+6.3	+17.1	+24.4	+28.6	+31.5	+37.9	+39.0	
5.0	794	-14.0		-13.9	-5.1	-3.3	-1.5	+2.3	+11.4	+21.0	+28.4	+33.4	+34.2	+44.9	+51.0	
6.0	794	-17.0		-14.9	-10.4	-3.1	-0.6	+4.4	+14.5	+24.7	+32.2	+37.4	+43.1	+47.9	+53.0	
7.0	794	-17.0		-15.7	-6.6	-1.0	-0.1	+5.8	+17.0	+28.1	+36.6	+41.8	+47.5	+53.9	+60.0	
8.0	794	-15.0			-5.9	-2.6	+0.2	+7.5	+19.9	+32.7	+43.6	+49.0	+50.8	+64.9	+69.0	
9.0	794	-30.0		-12.7	-7.1	-3.3	+0.0	+8.2	+23.2	+38.0	+48.7	+55.6	+60.7	+70.9	+73.0	
10.0	794	-24.0		-20.9	-7.7	-3.2	+0.0	+9.3	+26.6	+42.0	+54.3	+60.0	+67.5	+70.9	+84.0	
11.0	794	-17.0		-15.9	-7.0	-2.5	+0.7	+10.1	+28.5	+45.3	+57.4	+65.0	+69.5	+86.9	+91.0	
12.0	794	-12.0		-10.7	-8.7	-0.0	+2.3	+13.5	+31.2	+47.3	+59.2	+68.0	+73.1	+94.9	+96.0	
13.0	794	-7.0		-6.9	-1.5	+1.4	+6.0	+15.2	+31.0	+47.3	+58.8	+65.6	+70.8	+76.9	+78.0	
14.0	794	-3.0		-2.9	+1.3	+4.2	+7.1	+15.1	+30.0	+44.3	+55.5	+64.0	+71.2	+77.4	+78.0	
15.0	794	-8.0		-3.9	+0.7	+3.9	+7.4	+14.3	+26.5	+39.4	+47.2	+54.0	+61.7	+70.4	+71.0	
16.0	794	-4.0		-3.9	+0.1	+3.1	+6.1	+12.3	+23.0	+32.8	+40.3	+45.8	+54.5	+59.9	+61.0	
17.0	794	-13.0		-7.9	-2.7	+0.1	+3.4	+9.6	+18.5	+26.7	+34.2	+39.0	+44.2	+54.9	+57.0	
18.0	794	-6.0		-5.9	-3.1	-1.3	+1.2	+6.3	+14.2	+21.5	+28.1	+31.4	+34.2	+40.4	+41.0	
19.0	794	-7.0			-4.5	-2.2	+0.5	+2.3	+7.7	+16.5	+22.9	+25.8	+30.8	+33.9	+36.0	
20.0	794	-6.0		-5.9	-4.3	-3.2	-1.6	+0.4	+5.3	+12.0	+19.8	+22.8	+26.1	+33.9	+36.0	
21.0	794	-9.0			-6.5	-5.2	-2.4	-0.3	+5.0	+11.6	+16.8	+21.0	+24.2	+32.9	+35.0	
22.0	794	-10.0		-9.9	-8.2	-5.9	-4.0	-0.4	+4.0	+10.9	+16.4	+19.3	+21.6	+27.9	+31.0	
23.0	794	-13.0		-10.9	-8.0	-5.7	-4.0	-0.2	+6.0	+12.2	+17.1	+20.4	+23.7	+27.9	+29.0	
24.0	794	-10.0			-9.5	-7.4	-4.6	+0.6	+7.5	+15.1	+20.2	+25.2	+28.4	+31.9	+35.0	
25.0	794	-21.0		-13.9	-10.0	-7.5	-5.0	+2.0	+9.4	+23.3	+28.4	+33.4	+38.4	+43.9	+48.0	
26.0	794	-16.0		-14.7	-11.0	-8.3	-5.1	+2.4	+10.7	+19.1	+25.0	+29.6	+32.2	+35.9	+38.0	
27.0	794	-21.0			-13.5	-9.7	-5.9	+2.0	+12.1	+21.0	+26.5	+30.6	+33.3	+35.9	+38.0	
28.0	130	-23.2			-13.7	-12.5	-9.2	-1.4	15.3	28.7	29.4	30.0	32.7	34.0	34.2	
29.0	130	-25.2			-14.7	-12.0	-10.1	-1.7	18.0	25.1	29.4	32.0	37.7	42.4	43.0	
30.0	130	-25.7			-14.6	-11.4	-8.8	-1.3	20.1	24.4	34.5	35.7	38.4	44.0	45.2	
31.0	140	-23.1			-14.6	-10.4	-9.2	1.0	23.7	31.5	34.5	43.4	43.0	44.5	44.7	
32.0	141	-20.9			-13.6	-9.0	-9.0	0.4	26.2	33.4	39.3	42.4	52.3	52.4	52.9	
33.0	141	-24.8			-12.6	-10.6	-9.0	0.7	28.1	37.5	46.5	50.0	54.5	65.1	65.3	
34.0	141	-31.2			-13.6	-12.4	-10.5	-1.6	27.7	40.5	53.0	57.4	61.6	63.0	64.2	
35.0	141	-30.5			-17.8	-14.8	-11.3	-2.2	25.9	43.0	56.7	61.0	62.6	64.1	64.4	
36.0	141	-30.0			-18.6	-13.9	-12.0	-2.5	26.5	45.3	56.0	62.8	65.6	71.1	71.4	
37.0	141	-32.4			-24.6	-17.4	-12.7	-2.6	28.1	44.4	59.7	62.0	65.4	72.5	72.5	
38.0	141	-34.5			-32.6	-17.4	-11.7	-2.7	29.4	44.4	62.0	65.0	71.4	73.4	73.7	
39.0	142	-34.1			-32.6	-19.4	-12.9	-0.5	33.7	50.5	61.0	64.0	70.4	71.4	71.7	
40.0	142	-39.5			-37.6	-20.4	-15.0	-3.8	36.7	53.2	62.5	64.0	70.4	71.4	71.4	
41.0	142	-44.4			-41.6	-20.0	-14.0	-4.2	37.0	55.5	61.0	65.0	70.4	73.4	73.4	
42.0	140	-51.8			-42.6	-18.0	-17.3	-0.0	37.1	56.4	62.4	69.0	70.4	72.0	73.1	
43.0	139	-50.1			-42.6	-21.0	-15.5	-2.0	35.2	55.7	62.4	69.0	72.4	74.7	74.9	
44.0	140	-40.3				-24.4	-15.0	-1.4	32.1	56.0	66.5	72.0	73.4	74.7	77.3	
45.0	138	-41.4			-34.6	-27.0	-13.1	-1.3	30.0	60.4	69.0	72.0	73.4	77.0	77.3	
46.0	137	-34.8			-31.6	-22.0	-11.1	-0.5	27.9	62.5	71.5	75.4	77.4	79.0	79.3	
47.0	136	-37.8			-31.6	-21.0	-10.6	-0.3	28.3	64.5	77.1	79.4	80.4	84.1	84.3	
48.0	136	-34.6				-11.0	-9.1	-0.5	28.0	64.7	80.2	83.0	86.4	89.1	89.3	
49.0	130	-31.1			-27.7	-26.0	-8.7	0.2	27.0	64.5	81.5	87.4	89.7	90.5	90.6	
50.0	127	-27.9			-21.7	-20.6	-11.6	0.4	25.5	67.9	80.3	89.1	89.0	90.1	90.3	
51.0	122	-26.2			-23.4	-22.2	-12.4	-0.3	27.0	69.5	83.0	89.2	89.4	90.5	90.6	
52.0	115	-40.2			-23.0	-23.2	-12.2	-0.4	24.3	50.4	84.3	89.0	91.0	102.4	102.7	
53.0	110	-47.8			-25.0	-23.5	-15.5	1.5	22.0	64.0	84.5	91.4	96.0	116.2	116.5	
54.0	102	-32.1			-23.7	-23.7	-16.0	-0.0	24.0	64.0	84.5	91.4	101.0	124.5	124.5	
55.0	92	-34.9				-21.0	-19.7	2.9	25.0	69.4	84.4	97.0	111.1	112.3	112.5	
56.0	81	-23.0				-21.2	-13.9	2.4	27.4	74.1	97.0	110.2	131.4	132.3	132.5	
57.0	67	-20.5				-22.7	-21.6	1.6	29.5	76.4	94.4	101.4	105.4	105.1	105.2	
58.0	51	-34.1			-23.4	-19.7	-14.7	2.5	21.4	62.0	94.5	104.0	105.4	107.0	107.0	
59.0	34	-31.1				-25.1	-24.3	3.2	24.3	60.4	89.1	127.1	127.4	127.5	127.5	
60.0	22	-33.1				-31.9	-1.4	30.0	56.5	102.0	145.3	145.5	145.6	145.6	145.6	
61.0	15	-32.1					4.4	31.5	84.6	120.1	120.4	120.5	120.5	120.5	120.5	
62.0	4	10.1						25.3	43.0	56.7	133.5	133.6	133.7	133.8	133.8	
63.0	2	69.6							61.0	51.7	61.0	61.0	62.0	62.0	62.0	
64.0	1	64.3													65.3	

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 7.1

DATA SOURCE										JANUARY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN. SPEED	DIR (DEG)	CUMULATIVE PERCENTAGE FREQUENCY						MAX SPEED	DIR (DEG)				
				0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	
5FC	744	-11.0		-9.1	-7.9	-6.8	-4.5	-1.3	+1.6	+3.7	+4.9	+6.3	+7.9	+9.0	
1.0	744	-15.9	-17.9	-14.3	-11.9	-7.2	-0.6	+4.6	+8.5	+10.8	+12.8	+16.9	+20.0		
2.0	744	-24.0	-27.9	-19.6	-17.1	-13.3	-8.9	+2.3	+2.6	+6.1	+7.7	+10.5	+14.9	+18.0	
3.0	744	-36.0	-32.9	-23.0	-20.5	-14.3	-10.9	+4.1	+1.7	+5.5	+7.4	+9.7	+15.9	+21.0	
4.0	744	-30.0	-35.9	-27.6	-23.6	-18.2	-12.2	-5.3	+0.4	+5.0	+6.9	+10.3	+14.9	+25.0	
5.0	744	-44.0	-39.9	-32.2	-25.5	-20.5	-14.3	-6.6	+3.6	+3.6	+7.0	+11.3	+15.9	+25.0	
6.0	744	-44.0	-43.9	-34.5	-28.6	-23.3	-16.1	-7.8	-0.7	+3.4	+6.3	+11.5	+21.9	+31.0	
7.0	744	-48.0		-38.2	-31.0	-26.4	-17.5	-9.5	-1.1	+3.2	+7.4	+12.5	+21.9	+32.0	
8.0	744	-56.0	-53.9	-41.5	-36.5	-29.5	-19.6	-11.0	-2.3	+3.9	+9.0	+12.5	+24.9	+26.0	
9.0	744	-60.0	-50.9	-44.7	-39.2	-31.4	-22.1	-12.4	-2.2	+4.1	+9.0	+14.5	+26.4	+27.0	
10.0	744	-48.0	-46.9	-46.1	-42.5	-35.2	-24.9	-14.1	+3.3	+2.6	+7.8	+16.2	+24.6	+25.0	
11.0	744	-62.0	-54.9	-50.8	-46.0	-38.3	-27.0	-15.6	+4.4	+2.2	+8.0	+13.5	+24.9	+26.0	
12.0	744	-62.0	-55.9	-51.5	-46.4	-38.9	-28.3	-16.6	-5.8	-0.1	+6.5	+12.5	+20.9	+29.0	
13.0	744	-65.0	-62.9	-54.5	-41.2	-36.1	-27.7	-17.0	-6.7	-0.6	+4.5	+6.0	+17.9	+26.0	
14.0	744	-57.0	-50.9	-39.1	-36.3	-32.9	-25.7	-17.3	-7.5	-1.1	+0.3	+6.5	+18.9	+20.0	
15.0	744	-48.0	-45.9	-37.5	-32.8	-24.8	-22.6	-14.8	-6.8	-0.8	+0.7	+6.7	+14.9	+17.0	
16.0	744	-35.0		-31.8	-28.0	-25.1	-19.9	-12.4	-5.3	-0.5	+0.8	+4.5	+11.9	+13.0	
17.0	744	-30.0		-25.8	-24.0	-21.4	-17.0	-10.3	-3.4	-0.2	+2.4	+4.5	+8.9	+12.0	
18.0	744	-25.0		-21.5	-19.2	-16.9	-12.9	-7.6	-2.3	+0.1	+2.0	+3.8	+6.9	+9.0	
19.0	744	-20.0	-23.9	-17.8	-15.8	-13.9	-9.6	-5.0	-0.9	+0.6	+2.2	+4.5	+5.9	+8.0	
20.0	744	-21.0	-20.9	-16.1	-13.0	-10.6	-7.0	-3.5	-0.4	+0.6	+4.1	+7.9	+12.0		
21.0	744	-21.0	-17.9	-14.7	-12.1	-7.7	-6.5	-2.4	-0.0	+2.0	+3.6	+6.8	+12.0	+14.0	
22.0	744	-17.0	-18.9	-14.3	-11.4	-8.6	-6.0	-2.0	+1.0	+4.3	+5.8	+7.5	+11.4	+12.0	
23.0	744	-20.0	-19.9	-12.2	-10.6	-8.5	-5.7	-1.4	+1.8	+5.0	+6.8	+8.5	+18.9	+26.0	
24.0	744	-17.0	-15.9	-12.5	-10.3	-8.6	-5.8	-1.6	+2.4	+6.3	+7.7	+9.6	+18.9	+20.0	
25.0	744	-20.0	-18.9	-13.7	-12.3	-9.9	-6.4	-2.2	+2.7	+5.9	+8.6	+11.3	+18.9	+25.0	
26.0	744	-20.0		-17.1	-14.0	-11.4	-7.3	-2.9	+2.8	+7.8	+11.0	+14.7	+19.9	+23.0	
27.0	744	-20.0	-18.9	-14.2	-11.4	-8.2	-4.9	+4.5	+10.4	+13.5	+17.7	+25.4	+26.0		
28.0	105	-14.0		-16.0	-15.6	-12.7	-8.2	-2.7	7.0	14.4	14.4	21.0	23.1	23.1	
29.0	107	-31.2		-22.0	-18.6	-13.8	-9.0	-2.5	7.0	16.8	22.4	23.0	24.2	24.4	
30.0	108	-26.9		-22.0	-17.4	-16.3	-11.0	-4.2	4.0	19.8	21.0	23.0	26.2	26.4	
31.0	109	-27.0		-21.0	-19.5	-17.3	-11.0	-4.2	12.0	20.8	27.6	28.0	32.2	32.4	
32.0	111	-28.2		-22.0	-19.3	-17.6	-9.7	13.1	22.4	24.4	29.0	30.0	30.0	30.1	
33.0	115	-24.2		-26.0	-22.4	-20.6	-16.7	-5.0	14.2	24.1	24.4	29.0	30.4	30.9	
34.0	117	-20.9		-27.0	-25.3	-23.0	-18.7	-7.4	13.8	25.7	32.4	33.8	34.7	34.8	
35.0	116	-34.2		-30.8	-27.4	-24.6	-20.3	-7.7	13.8	30.2	40.2	40.0	44.0	45.1	
36.0	116	-30.5		-29.8	-28.4	-27.1	-21.1	-7.0	10.0	30.6	38.4	43.8	44.7	44.8	
37.0	114	-40.2		-31.0	-29.4	-25.8	-19.6	-7.3	9.9	37.0	39.2	42.6	42.6	42.6	
38.0	115	-40.7		-30.8	-28.4	-24.1	-20.4	-6.0	7.0	33.6	37.0	39.2	49.8	49.7	
39.0	117	-31.4		-28.8	-27.2	-25.2	-19.9	-5.5	12.4	34.2	43.4	49.8	52.5	52.5	
40.0	116	-31.2		-30.8	-29.4	-25.2	-17.4	-7.6	8.4	27.3	37.4	49.0	60.9	61.1	
41.0	117	-30.2		-26.0	-25.3	-23.1	-17.5	-8.1	10.2	31.2	35.4	52.8	61.0	62.0	
42.0	114	-26.8		-25.0	-23.9	-23.3	-16.5	-7.3	10.0	27.3	36.0	59.0	65.2	65.5	
43.0	113	-31.8		-26.0	-26.2	-23.1	-15.4	-5.5	11.5	25.4	34.0	62.0	64.0	64.2	
44.0	113	-30.1		-29.0	-25.4	-23.4	-16.4	-5.2	13.0	26.4	30.8	50.0	59.0	59.1	
45.0	111	-31.0		-30.0	-30.2	-23.8	-15.7	-5.2	11.4	37.6	40.2	49.2	49.2	49.4	
46.0	110	-34.9		-31.0	-30.5	-24.5	-14.8	-1.5	12.4	21.5	35.6	46.0	53.8	54.0	
47.0	106	-47.2		-33.0	-32.6	-22.8	-14.0	1.0	12.4	18.0	46.6	53.0	59.6	59.7	
48.0	104	-44.9		-32.0	-25.6	-24.4	-12.5	0.4	12.4	24.4	44.6	49.0	50.6	50.7	
49.0	100	-47.0		-47.0	-24.0	-23.0	-14.1	-1.5	12.1	24.0	33.7	35.0	43.2	43.4	
50.0	100	-40.1		-49.0	-28.7	-24.0	-15.5	-0.9	12.1	20.0	30.7	34.0	40.2	40.4	
51.0	95	-37.9		-27.8	-25.6	-14.5	-8.3	10.0	19.4	22.0	37.0	37.0	37.0	37.0	
52.0	98	-40.1		-31.0	-28.8	-18.7	-8.5	0.5	15.4	21.0	34.1	39.0	39.0	39.1	
53.0	93	-41.5		-34.1	-30.4	-23.9	-7.4	8.5	16.0	24.1	36.2	37.0	37.0	37.1	
54.0	72	-40.8		-30.4	-33.4	-24.6	-8.0	7.0	19.4	23.4	32.3	33.0	33.0	33.1	
55.0	64	-44.1		-45.5	-34.4	-24.8	-11.0	7.4	14.8	24.4	24.7	25.0	25.0	25.1	
56.0	57	-50.4		-34.7	-32.1	-26.5	-12.5	6.0	17.4	19.7	25.4	25.4	26.3	26.4	
57.0	46	-51.6		-44.0	-31.7	-24.0	-13.0	2.4	15.4	15.4	15.4	15.4	15.4	15.4	
58.0	26	-56.9			-33.7	-19.0	-0.9	13.7	14.4	14.4	14.4	14.4	14.4	14.4	
59.0	14	-51.8			-38.1	-14.0	3.1	8.1	4.6	8.7	4.8	4.8	4.8	4.8	
60.0	10	-44.8			-44.4	-11.0	-3.6	2.7	3.1	3.1	3.1	3.1	3.1	3.1	
61.0	7	-43.4			-38.0	-14.5	-6.1	2.7	2.0	2.0	2.0	2.0	2.0	2.0	
62.0	6	-38.9			-23.0	2.0	2.0	2.7	2.0	2.0	2.0	2.0	2.0	2.0	
63.0	5	-31.5			-10.5	2.2	2.4	2.4	2.0	2.0	2.0	2.0	2.0	2.0	
64.0	4	-27.0			-23.0	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
65.0	3	-24.3			-10.5	-5.6	-5.4	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	
66.0	3	-24.9			-23.5	-12.5	-12.1	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	
67.0	3	-35.6			-29.5	-16.5	-16.4	-16.0	-16.0	-16.0	-16.0	-16.0	-16.0	-16.0	
68.0	4	-43.9			-31.0	-14.4	-14.2	-14.0	-14.0	-14.0	-14.0	-14.0	-14.0	-14.0	
69.0	4	-54.5			-27.0	-13.5	-13.1	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	
70.0	4	-57.1			-15.0	-0.5	-0.5	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	

Positive is wind from the right (150°).
Negative is wind from the left (330°).

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH

TABLE 7.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 674	-11.0				-7.0	-7.0	-7.0	-7.4	-0.0	+2.9	+5.1	+6.1	+7.5	+10.0	+11.0	
1.0 674	-23.7				-16.1	-13.7	-11.5	-9.3	-7.0	+5.8	+9.7	+13.2	+14.4	+18.0	+19.0	
2.0 674	-26.0				-21.9	-19.6	-14.7	-8.7	-1.7	+3.4	+7.6	+9.1	+10.8	+15.0	+16.0	
3.0 674	-32.0				-27.4	-23.3	-18.1	-10.5	-3.2	+2.9	+6.0	+8.3	+10.0	+17.0	+18.0	
4.0 674	-39.0				-32.0	-25.2	-19.4	-11.8	-4.5	+1.9	+6.6	+8.5	+9.8	+20.0	+21.0	
5.0 674	-50.0				-35.2	-28.8	-22.5	-14.1	-5.9	+1.2	+5.5	+7.4	+10.6	+21.0	+22.0	
6.0 674	-58.0				-35.1	-28.5	-23.6	-15.6	-7.2	-0.1	+4.8	+7.5	+11.0	+21.0	+22.0	
7.0 674	-66.0				-36.2	-32.2	-25.4	-17.2	-9.1	-0.4	+4.7	+6.6	+10.2	+37.0	+38.0	
8.0 674	-65.0				-38.6	-34.5	-27.4	-20.3	-10.5	-0.8	+3.9	+6.1	+14.0	+30.0	+31.0	
9.0 674	-66.0				-41.1	-35.2	-30.6	-22.8	-12.2	-2.0	+3.6	+7.5	+13.5	+34.0	+35.0	
10.0 674	-66.0				-46.1	-41.1	-35.0	-25.1	-13.6	-3.3	+2.7	+7.5	+16.2	+37.0	+38.0	
11.0 674	-66.0				-47.4	-43.5	-38.4	-28.3	-15.5	-4.8	+2.5	+5.6	+15.2	+39.5	+40.0	
12.0 674	-67.0				-51.1	-44.7	-37.1	-29.6	-16.3	-5.8	+0.0	+4.5	+17.0	+41.0	+42.0	
13.0 674	-67.0				-49.9	-42.1	-35.7	-27.6	-16.7	-7.4	-1.1	+0.1	+16.2	+41.0	+42.0	
14.0 674	-67.0				-41.1	-35.2	-32.4	-25.3	-16.9	-7.3	-0.7	+0.5	+16.2	+41.0	+42.0	
15.0 674	-67.0				-35.8	-32.5	-27.3	-22.7	-14.4	-5.9	-0.9	+1.3	+16.0	+41.0	+42.0	
16.0 674	-67.0				-30.2	-28.3	-25.9	-20.6	-12.0	-4.8	-0.4	+1.2	+16.0	+41.0	+42.0	
17.0 674	-67.0				-26.8	-25.3	-22.6	-17.2	-10.1	-3.6	-0.1	+1.7	+16.0	+41.0	+42.0	
18.0 674	-67.0				-21.3	-19.5	-17.6	-13.6	-7.0	-2.5	-0.1	+1.5	+16.0	+41.0	+42.0	
19.0 674	-67.0				-18.0	-16.1	-12.9	-9.9	-5.2	-0.6	-1.5	+3.0	+16.0	+41.0	+42.0	
20.0 674	-67.0				-16.4	-11.7	-9.5	-6.7	-2.7	-0.2	+2.9	+5.1	+7.1	+19.0	+19.0	
21.0 674	-67.0				-14.8	-12.7	-7.5	-6.1	-1.0	-1.1	-4.5	+6.3	+9.1	+12.0	+13.0	
22.0 674	-67.0				-14.1	-11.5	-9.3	-5.5	-1.4	-1.3	-4.3	+6.6	+8.1	+12.0	+13.0	
23.0 674	-67.0				-13.1	-10.2	-8.2	-5.2	-0.9	-2.1	-5.0	+6.9	+9.4	+18.0	+19.0	
24.0 674	-67.0				-11.7	-9.4	-7.6	-4.8	-1.0	-2.1	-5.7	+8.2	+10.1	+18.0	+19.0	
25.0 674	-67.0				-11.6	-10.1	-8.0	-4.9	-1.5	-1.7	-5.3	+7.4	+11.2	+17.0	+18.0	
26.0 674	-67.0				-12.0	-9.8	-8.4	-5.9	-1.8	-1.8	-6.1	+9.5	+12.6	+23.0	+24.0	
27.0 674	-67.0				-12.5	-10.9	-9.3	-6.4	-2.2	-2.5	-6.4	+10.7	+13.2	+22.0	+23.0	
28.0 82	-12.0				-11.1	-9.5	-6.7	-2.0	-2.2	-2.2	-4.0	-9.1	-10.4	-11.3	-11.5	
29.0 82	-14.5				-13.1	-11.0	-8.5	-3.0	-1.4	-1.4	-6.3	-7.1	-10.1	-10.7	-10.8	
30.0 81	-20.4				-16.5	-12.0	-8.5	-3.8	-1.0	-1.0	-4.0	-9.1	-9.4	-9.4	-9.4	
31.0 81	-17.5				-15.2	-13.9	-9.0	-4.1	-1.0	-1.0	-5.5	-9.0	-11.1	-11.6	-11.6	
32.0 81	-14.6				-15.2	-14.3	-12.4	-6.3	-1.6	-1.6	-6.7	-10.2	-12.2	-12.9	-13.0	
33.0 84	-23.5				-20.0	-18.5	-14.3	-7.7	-0.7	-0.7	-6.3	-9.0	-11.1	-11.5	-11.5	
34.0 94	-23.4				-21.0	-20.4	-16.8	-10.7	-2.4	-2.4	-6.2	-10.0	-12.1	-13.1	-13.3	
35.0 100	-27.0				-23.7	-22.3	-19.2	-10.4	-1.0	-1.0	-6.0	-7.0	-9.7	-9.3	-9.4	
36.0 102	-37.1				-29.0	-23.8	-21.4	-17.0	-11.2	-8.1	-5.0	-9.7	-11.0	-12.3	-12.5	
37.0 105	-31.2				-28.0	-24.6	-21.4	-18.3	-11.8	-8.2	-5.8	-7.6	-13.0	-14.0	-14.2	
38.0 107	-26.3				-26.0	-25.6	-22.8	-18.5	-11.0	-7.7	-6.5	-8.6	-13.0	-14.0	-15.1	
39.0 108	-29.7				-27.0	-26.4	-23.6	-19.5	-12.2	-7.4	-8.4	-10.6	-12.0	-13.5	-13.5	
40.0 109	-27.1				-25.0	-24.4	-22.7	-19.2	-11.5	-7.1	-7.6	-12.6	-13.0	-21.0	-24.0	
41.0 112	-30.3				-24.0	-25.7	-24.7	-20.4	-10.7	-7.7	-7.7	-15.6	-14.0	-35.0	-36.0	
42.0 109	-27.6				-27.5	-26.5	-23.8	-20.3	-9.7	-0.3	-7.6	-14.8	-19.0	-32.0	-32.2	
43.0 104	-28.6				-28.5	-27.4	-25.6	-20.3	-9.6	-1.4	-8.5	-16.6	-18.4	-18.7	-18.8	
44.0 106	-29.9				-29.0	-28.3	-24.7	-20.4	-8.8	-0.3	-7.0	-11.6	-13.9	-15.2	-15.4	
45.0 106	-29.8				-29.0	-28.3	-25.7	-20.4	-8.5	-1.1	-9.4	-12.6	-15.0	-22.8	-23.0	
46.0 102	-33.3				-29.0	-27.8	-25.9	-19.8	-8.0	-1.1	-11.5	-17.7	-20.0	-25.8	-25.9	
47.0 102	-29.5				-29.5	-27.8	-25.9	-19.8	-7.7	-1.0	-7.6	-15.7	-20.0	-24.2	-24.4	
48.0 94	-32.7				-30.4	-27.6	-21.2	-16.6	-6.6	-1.8	-6.6	-9.0	-14.0	-18.5	-18.6	
49.0 96	-35.5				-31.7	-31.1	-21.0	-17.5	-1.2	-1.2	-5.0	-7.0	-12.1	-13.0	-13.2	
50.0 90	-32.1				-31.0	-29.2	-21.0	-19.8	-1.6	-1.6	-7.5	-12.0	-16.1	-16.7	-16.8	
51.0 84	-34.7				-32.1	-29.6	-23.4	-19.8	-1.4	-1.4	-6.0	-15.1	-19.1	-19.6	-19.7	
52.0 80	-36.4				-34.2	-33.0	-25.3	-19.5	-0.8	-0.8	-4.0	-12.0	-24.0	-25.0	-25.1	
53.0 74	-41.1				-35.3	-35.3	-25.8	-18.0	-4.7	-10.2	-17.3	-23.2	-23.9	-23.9	-23.9	
54.0 64	-47.1				-39.7	-39.7	-28.4	-15.0	-4.8	-5.7	-20.6	-21.3	-21.8	-21.8	-21.8	
55.0 60	-47.4				-40.4	-37.5	-29.2	-15.0	-4.5	-6.0	-19.6	-22.2	-22.5	-22.5	-22.5	
56.0 50	-47.5				-40.2	-39.7	-33.1	-18.0	-2.6	-4.5	-12.0	-17.3	-17.5	-17.5	-17.5	
57.0 45	-52.8				-42.7	-42.7	-32.0	-18.7	-5.0	-3.4	-8.0	-21.0	-21.0	-21.0	-21.0	
58.0 39	-58.7				-44.1	-43.8	-30.2	-20.7	-4.2	-5.1	-6.1	-6.1	-6.1	-6.1	-6.1	
59.0 27	-74.5				-41.6	-37.7	-17.7	-7.6	-11.7	-19.4	-19.4	-19.4	-19.4	-19.4	-19.4	
60.0 20	-75.6				-46.0	-35.8	-17.0	-4.2	-17.0	-20.6	-20.6	-20.6	-20.6	-20.6	-20.6	
61.0 13	-50.2				-36.0	-35.5	-21.5	-8.1	-15.2	-15.5	-15.5	-15.5	-15.5	-15.5	-15.5	
62.0 7	-44.2				-37.9	-31.5	-20.1	-7.0	-7.0	-6.8	-6.8	-6.8	-6.8	-6.8	-6.8	
63.0 4	-48.5				-38.0	-35.0	-24.5	-8.2	-8.2	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1	
64.0 2	-46.6				-47.0	-47.0	-32.1	-13.1	-31.4	-31.4	-31.4	-31.4	-31.4	-31.4	-31.4	
65.0 1	-32.0															
66.0 2	-24.4															
67.0 1	-12.4															
68.0 1	-70.9															
69.0 3	-54.3															
70.0 3	-91.5															

Positive is wind from the right (150°).
Negative is wind from the left (330°).

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.3

DATA SOURCE										MARCH						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM DBS	MIN SPEED	DIR (DEG)	0.135	1,000	2,280	5,000	15,900	50,000	84,100	95,000	97,720	99,000	99,865	MAX SPEED	DIR (DEG)
5FC	744	-12.0		-10.9	-8.9	-7.8	-6.6	-3.7	-0.5	+2.8	+5.2	+6.4	+7.1	+8.9	+11.0	
1.0	744	-21.0		-19.9	-15.7	-13.2	-10.7	-6.3	-0.5	+5.3	+8.1	+9.6	+11.0	+17.9	+20.0	
2.0	744	-25.0			-19.8	-16.4	-13.0	-7.9	-2.0	+2.2	+5.9	+7.8	+9.2	+12.9	+16.0	
3.0	744	-32.0			-20.8	-18.4	-15.2	-10.5	-4.0	+1.6	+4.9	+7.5	+9.1	+12.4	+13.0	
4.0	744	-37.0		-33.9	-23.7	-21.0	-18.1	-13.8	-5.0	+0.1	+4.6	+7.0	+9.1	+13.9	+17.0	
5.0	744	-37.0		-35.9	-28.2	-23.8	-21.5	-15.8	-7.0	+0.8	+2.9	+5.0	+7.5	+12.9	+14.0	
6.0	744	-45.0		-37.9	-29.8	-26.6	-22.9	-18.3	-9.4	-1.3	+2.0	+4.7	+7.8	+14.9	+19.0	
7.0	744	-45.0		-40.9	-32.7	-30.3	-26.3	-20.3	-11.1	-2.2	+1.3	+4.6	+6.6	+12.9	+22.0	
8.0	744	-41.0			-35.5	-32.2	-28.9	-22.9	-12.4	-3.6	+0.3	+3.8	+7.8	+17.9	+22.0	
9.0	744	-53.0		-52.9	-43.8	-38.5	-33.2	-24.9	-14.0	-4.3	+0.5	+5.5	+11.0	+26.9	+35.0	
10.0	744	-84.0		-54.9	-46.7	-43.2	-34.0	-30.2	-16.4	-5.5	+1.7	+6.5	+15.0	+29.9	+32.0	
11.0	744	-67.0		-65.9	-55.5	-50.0	-43.5	-32.7	-18.3	-6.1	+2.2	+8.6	+21.7	+26.9	+37.0	
12.0	744	-79.0		-63.9	-58.5	-50.0	-43.2	-33.5	-20.1	-7.4	+0.1	+5.0	+11.5	+19.9	+22.0	
13.0	744	-82.0		-60.9	-52.5	-44.6	-41.1	-32.1	-20.0	-9.1	+1.3	+1.5	+6.3	+10.9	+17.0	
14.0	744	-85.0			-47.5	-41.3	-36.6	-29.0	-18.5	-9.2	+3.7	+0.4	+1.5	+9.9	+21.0	
15.0	744	-84.0			-40.1	-37.0	-32.2	-25.4	-16.3	-7.1	-2.7	+0.4	+1.2	+18.9	+27.0	
16.0	744	-38.0		-35.9	-32.8	-31.0	-24.3	-21.7	-13.0	-6.1	+1.0	+0.0	+3.5	+16.9	+18.0	
17.0	744	-43.0		-36.9	-28.3	-26.5	-23.6	-18.1	-10.0	-4.0	+0.4	+1.4	+4.0	+8.4	+9.0	
18.0	744	-43.0		-28.9	-23.7	-21.0	-17.0	-13.7	-7.0	-2.6	+0.1	+1.7	+6.7	+16.9	+18.0	
19.0	744	-27.0		-24.9	-18.7	-16.0	-12.0	-9.7	-5.0	-0.7	+1.5	+5.2	+8.5	+15.9	+18.0	
20.0	744	-21.0		-20.9	-16.3	-13.0	-10.5	-6.7	-3.0	+0.0	+3.7	+5.6	+7.0	+13.4	+14.0	
21.0	744	-20.0		-17.9	-10.9	-8.6	-6.1	-5.5	-1.0	+1.2	+4.5	+7.2	+9.5	+14.9	+17.0	
22.0	744	-20.0		-18.9	-11.3	-9.5	-7.2	-4.6	-0.0	+1.9	+4.5	+6.5	+9.5	+22.9	+27.0	
23.0	744	-15.0		-14.9	-10.3	-8.3	-6.5	-3.7	-0.0	+2.4	+9.9	+7.0	+10.7	+25.9	+28.0	
24.0	744	-28.0		-13.9	-8.0	-6.5	-3.7	-0.7	+2.7	+5.8	+7.8	+10.7	+23.9	+25.0		
25.0	744	-16.0		-14.9	-12.2	-9.0	-6.8	-4.3	-0.7	+2.1	+5.7	+8.7	+10.5	+19.9	+24.0	
26.0	744	-19.0		-16.9	-12.5	-10.0	-8.2	-5.0	-1.0	+1.7	+5.4	+8.0	+11.7	+20.9	+24.0	
27.0	744	-20.0		-17.9	-12.1	-10.6	-9.1	-5.3	-1.4	+2.4	+6.3	+9.6	+15.1	+23.9	+27.0	
28.0	89	-11.3			-8.0	-7.4	-4.8	-4.0	0.0	3.5	6.4	7.0	7.4	8.3	8.4	
29.0	94	-16.7			-9.0	-6.5	-5.0	-0.7	3.5	6.4	8.4	9.1	9.7	9.4		
30.0	97	-11.1			-11.0	-7.1	-7.1	-2.8	3.2	6.1	7.0	8.0	8.4	8.5		
31.0	94	-17.5			-13.9	-12.7	-8.4	-0.0	1.0	6.0	6.7	7.0	7.4	7.7		
32.0	101	-19.4		-18.0	-15.0	-15.0	-10.5	-5.5	2.0	5.5	6.7	8.0	10.3	10.5		
33.0	103	-20.5		-17.8	-16.0	-14.1	-6.0	1.4	4.4	5.0	8.0	16.6	16.7			
34.0	103	-22.8		-22.0	-21.3	-19.7	-16.4	-5.4	1.2	4.0	5.0	9.0	21.0	21.2		
35.0	109	-35.4		-27.0	-25.5	-23.3	-17.0	-7.4	1.2	7.4	12.4	13.0	20.0	21.1		
36.0	109	-24.2		-26.0	-25.3	-21.4	-15.7	-7.2	0.0	6.0	14.5	15.0	19.5	19.6		
37.0	113	-29.9		-22.0	-21.4	-19.4	-15.5	-4.1	-0.3	7.7	15.0	19.3	19.7	19.7		
38.0	113	-30.3		-23.0	-22.7	-21.6	-15.4	-4.1	0.4	7.4	12.7	16.0	21.1	21.3		
39.0	114	-32.5		-27.0	-26.4	-21.6	-18.0	-4.5	0.2	9.3	15.0	16.0	20.6	20.7		
40.0	116	-29.5		-23.0	-23.2	-22.1	-18.3	-9.7	-0.4	11.1	18.0	17.2	17.5	17.5		
41.0	116	-37.6		-35.8	-25.8	-24.6	-19.4	-10.3	-1.0	13.2	15.7	17.5	18.1	18.2		
42.0	116	-27.8			-26.4	-24.2	-18.0	-11.1	-1.2	13.2	17.7	18.0	20.4	20.4		
43.0	116	-27.2		-26.0	-25.4	-22.3	-18.0	-10.3	-1.0	10.4	17.2	17.0	20.4	20.4		
44.0	113	-26.2		-25.0	-23.7	-22.2	-17.0	-0.8	1.4	8.4	14.0	15.0	18.2	18.5		
45.0	111	-31.1		-24.0	-21.0	-21.4	-16.9	-7.4	0.7	5.2	7.7	14.0	15.6	15.7		
46.0	110	-36.0		-26.0	-26.2	-22.5	-17.5	-7.7	-0.2	5.3	10.5	12.0	15.2	15.4		
47.0	108	-32.8		-29.0	-28.5	-23.6	-15.5	-8.2	-1.0	5.6	7.5	16.0	20.0	20.2		
48.0	107	-37.2		-31.0	-23.4	-21.8	-16.0	-7.0	-2.0	2.0	7.4	17.0	19.0	19.2		
49.0	106	-33.0		-27.0	-25.6	-21.4	-16.1	-9.0	-1.5	5.8	8.4	13.0	21.5	21.6		
50.0	102	-35.5		-25.0	-22.7	-20.9	-14.0	-10.7	-1.4	4.4	6.7	8.0	22.0	23.0		
51.0	97	-32.6			-23.8	-22.5	-19.6	-11.8	-1.7	5.1	8.0	10.3	10.4	10.4		
52.0	94	-29.5			-26.4	-25.1	-22.0	-13.4	-3.5	3.2	4.0	16.1	17.3	17.5		
53.0	87	-27.2			-26.7	-21.7	-14.7	-8.3	0.7	4.0	4.7	5.1	5.1	5.2		
54.0	80	-31.3			-29.2	-24.0	-23.1	-15.8	-6.0	-1.0	2.0	3.1	3.7	3.7		
55.0	69	-31.5			-30.4	-28.6	-25.0	-16.7	-6.2	-1.4	3.2	3.5	3.7	3.7		
56.0	60	-32.8			-30.6	-29.0	-23.5	-16.2	-6.3	0.5	3.6	10.5	11.1	11.2		
57.0	51	-37.2			-32.4	-29.4	-23.9	-14.7	-4.1	5.5	8.0	10.5	10.9	11.0		
58.0	41	-35.4			-29.9	-24.2	-14.8	-3.5	4.0	20.1	20.6	20.0	21.0			
59.0	32	-30.5			-26.7	-24.0	-15.0	0.9	8.7	30.3	30.7	31.0	31.0			
60.0	22	-42.9			-30.0	-25.5	-0.5	3.5	22.0	35.0	35.7	35.0	35.9			
61.0	14	-33.0				-23.8	-14.0	5.8	39.3	39.0	40.0	40.1	40.1			
62.0	10	-36.5				-21.4	-12.0	13.0	29.4	29.0	30.1	30.2	30.2			
63.0	7	-37.1					-24.0	-7.7	3.0	26.0	27.1	27.3	27.3			
64.0	5	-29.4					-10.5	7.3	8.1	8.2	8.3	8.4	8.4			
65.0	3	-18.7					-15.5	-0.5	-0.3	-0.2	-0.2	-0.1	-0.1			
66.0	2	-18.7					-10.0	-2.5	-0.4	-0.4	-0.4	-0.4	-0.4			
67.0	1	-19.0														
68.0	1	-3.8														
69.0	1	3.0														
70.0	1	-4.0														

Positive is wind from the right (150°).
Negative is wind from the left (330°).

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-11.0		-7.9	-6.4	-5.3	-2.7	+0.4	+3.2	+5.3	+6.2	+6.7	+9.5	+10.0		
1.0	720	-21.0		-13.9	-11.2	-9.4	-5.3	+0.0	+5.3	+8.3	+9.7	+11.6	+16.0	+17.0		
2.0	720	-21.0		-15.7	-13.4	-11.3	-7.0	+1.4	+2.7	+6.2	+8.1	+9.8	+12.0	+13.0		
3.0	720	-26.0		-19.4	-17.3	-14.6	-9.9	-3.1	+2.1	+5.0	+6.6	+8.8	+11.6	+12.0		
4.0	720	-36.0		-24.8	-20.2	-16.8	-11.6	-4.8	+0.9	+4.4	+5.7	+6.9	+8.5	+9.0		
5.0	720	-38.0		-25.6	-22.3	-18.4	-13.5	-6.4	+0.1	+2.9	+4.8	+7.2	+15.0	+16.0		
6.0	720	-35.0		-29.5	-25.6	-21.6	-16.1	-8.0	+0.5	+2.4	+4.6	+5.6	+10.0	+11.0		
7.0	720	-46.0		-33.5	-26.4	-24.1	-18.2	-9.4	-1.4	+1.4	+3.6	+6.5	+16.0	+17.0		
8.0	720	-43.0		-39.8	-31.6	-27.0	-21.1	-11.3	-2.5	+0.6	+2.7	+5.5	+10.0	+11.0		
9.0	720	-37.0		-42.3	-35.6	-31.0	-23.6	-12.5	-3.3	+0.2	+3.1	+5.9	+11.0	+12.0		
10.0	720	-66.0		-46.3	-41.2	-34.5	-26.9	-14.4	-4.5	-0.1	+2.5	+5.4	+12.0	+13.0		
11.0	720	-57.0		-53.7	-46.6	-40.0	-30.3	-16.3	-5.7	-0.3	+2.6	+4.9	+11.0	+12.0		
12.0	720	-71.0		-57.7	-49.6	-44.0	-32.4	-18.4	-6.6	-1.0	+0.6	+2.9	+9.0	+10.0		
13.0	720	-70.0		-55.7	-49.9	-42.3	-32.4	-19.0	-8.3	-3.4	+0.6	+0.4	+3.5	+4.0		
14.0	720	-55.0		-47.0	-43.3	-36.0	-30.1	-18.0	-8.7	-4.2	-1.8	+0.6	+2.5	+3.0		
15.0	720	-52.0		-39.5	-36.5	-32.2	-25.2	-16.2	-8.3	-3.4	-1.5	+0.3	+3.0	+4.0		
16.0	720	-45.0		-35.9	-32.5	-27.3	-21.4	-13.3	-6.4	-2.3	+0.5	+0.4	+7.0	+8.0		
17.0	720	-42.0		-27.0	-24.9	-22.0	-16.7	-10.2	-4.5	-0.7	+0.1	+3.0	+15.0	+16.0		
18.0	720	-27.0		-21.3	-18.4	-16.3	-11.9	-6.4	-2.0	+0.1	+1.5	+3.7	+9.5	+10.0		
19.0	720	-75.0		-16.2	-13.7	-11.5	-7.7	-3.4	+0.3	+1.8	+3.7	+5.4	+15.0	+16.0		
20.0	720	-27.0		-13.4	-10.3	-8.0	-5.3	-1.4	+1.2	+3.4	+5.4	+6.9	+12.0	+13.0		
21.0	720	-20.0		-8.9	-7.5	-6.2	-3.9	-0.6	+1.9	+3.9	+5.0	+6.4	+12.0	+13.0		
22.0	720	-17.0		-6.9	-7.5	-5.4	-2.8	+0.4	+2.7	+5.0	+5.8	+7.3	+9.0	+10.0		
23.0	720	-21.0		-8.4	-6.9	-5.3	-2.5	+0.0	+3.0	+4.9	+6.4	+6.5	+12.0	+13.0		
24.0	720	-4.0		-8.4	-7.3	-5.0	-2.6	+0.0	+3.0	+5.3	+6.7	+6.7	+13.0	+14.0		
25.0	720	-4.0		-7.4	-6.5	-5.0	-2.6	+0.3	+2.4	+5.6	+6.9	+3.4	+13.5	+14.0		
26.0	720	-9.0		-8.1	-6.4	-5.4	-3.4	+0.3	+3.1	+5.8	+7.1	+7.9	+14.0	+15.0		
27.0	720	-11.0		-9.4	-8.5	-6.7	-4.2	+0.5	+3.1	+6.5	+8.6	+10.9	+13.0	+14.0		
28.0	90	-10.0		-8.4	-6.4	-6.7	-3.6	0.1	5.3	7.0	0.0	10.0	10.6	10.6		
29.0	90	-13.0		-8.7	-7.0	-4.8	-0.1	8.0	8.1	8.1	9.0	12.0	12.6	12.7		
30.0	103	-13.0		-12.3	-9.6	-5.7	-0.3	8.4	7.6	8.4	8.7	10.0	10.7	10.4		
31.0	107	-14.6		-12.0	-11.4	-10.3	-5.4	-1.2	8.3	5.3	7.0	8.7	10.6	10.7		
32.0	106	-18.1		-12.0	-11.3	-9.0	-7.4	-0.7	8.7	6.3	8.3	9.0	10.6	10.7		
33.0	106	-15.3		-14.0	-12.4	-9.3	-7.2	-2.7	2.2	4.6	6.6	7.0	10.0	10.2		
34.0	109	-19.2		-16.0	-15.3	-14.4	-9.3	-3.7	1.0	4.6	7.6	8.0	11.6	11.7		
35.0	110	-21.6		-10.0	-10.2	-15.2	-11.1	-0.4	1.4	5.6	6.7	8.0	11.2	11.4		
36.0	112	-24.2		-23.0	-17.7	-15.7	-12.4	-4.7	2.4	5.7	6.0	8.0	12.0	12.1		
37.0	112	-25.3		-24.0	-21.5	-15.2	-13.0	-4.5	3.4	5.7	7.0	7.0	8.7	8.8		
38.0	114	-33.1		-21.0	-19.4	-17.4	-12.3	-5.1	3.5	6.3	8.0	9.4	9.4	9.9		
39.0	112	-21.5		-19.0	-18.7	-16.5	-11.0	-3.0	4.1	5.2	11.6	12.0	13.5	13.6		
40.0	112	-25.0		-20.0	-19.7	-16.7	-12.2	-3.7	8.4	8.6	10.6	11.0	15.2	15.4		
41.0	113	-14.2		-17.0	-17.2	-14.3	-10.2	-6.1	8.0	8.1	8.7	9.0	14.0	14.1		
42.0	112	-17.5		-17.5	-17.5	-15.7	-9.8	-3.1	4.7	7.4	9.4	12.0	12.7	12.9		
43.0	112	-19.3		-18.0	-17.5	-15.6	-10.2	-0.5	9.4	10.1	10.0	12.0	14.2	14.4		
44.0	111	-25.1		-20.0	-19.5	-14.5	-9.1	0.3	7.5	12.5	13.0	14.6	15.2	15.3		
45.0	110	-21.2		-20.0	-17.5	-13.5	-7.7	0.2	8.2	14.3	16.2	17.0	17.5	17.6		
46.0	107	-20.8		-18.0	-17.6	-13.6	-8.7	2.2	3.0	14.6	16.6	18.6	19.1	19.2		
47.0	105	-27.6		-20.0	-19.3	-15.0	-10.6	0.5	8.0	12.0	14.6	16.0	19.5	19.5		
48.0	103	-21.7		-20.0	-18.4	-16.0	-11.4	-0.4	7.7	12.4	13.0	15.0	17.0	17.1		
49.0	103	-21.0		-20.0	-19.0	-17.0	-12.6	-0.0	6.4	14.3	15.7	17.0	22.5	22.6		
50.0	100	-23.5		-24.0	-21.7	-16.7	-11.4	-0.7	7.2	13.0	16.0	17.0	21.0	22.1		
51.0	100	-27.8		-24.0	-18.7	-16.5	-8.4	0.1	7.7	13.0	16.7	19.7	20.3	20.4		
52.0	98	-22.2		-17.1	-17.1	-10.6	-0.0	0.0	7.7	15.1	18.4	19.7	20.4	20.5		
53.0	92	-24.9		-17.0	-15.7	-10.2	-1.0	-1.0	7.5	13.4	15.0	20.1	21.0	21.1		
54.0	80	-23.2		-22.2	-18.0	-10.3	-2.0	6.4	12.0	12.7	14.1	14.7	14.7	14.7		
55.0	75	-20.9		-20.6	-19.2	-12.1	-2.5	6.1	10.6	14.1	14.6	14.7	14.7	14.7		
56.0	63	-27.7		-22.6	-17.4	-12.3	-3.5	5.0	11.0	14.4	15.2	15.6	15.6	15.6		
57.0	52	-21.4		-18.4	-17.7	-13.0	-3.4	5.6	10.3	11.0	16.5	16.5	16.0	17.0		
58.0	46	-23.4		-21.0	-19.4	-14.7	-6.0	3.4	6.0	9.0	13.7	14.2	14.2	14.2		
59.0	35	-21.5		-17.2	-17.2	-11.4	-4.1	3.0	12.3	13.0	13.0	13.0	14.1	14.2		
60.0	25	-36.7		-15.7	-15.7	-13.7	-1.7	7.5	10.4	14.4	14.4	14.4	14.7	13.7		
61.0	14	-28.0					-11.0	-1.0	13.4	14.4	15.4	15.4	15.4	15.4		
62.0	8	-4.1					-2.7	7.0	21.7	23.3	24.2	24.3	24.4	24.4		
63.0	4	-3.0						2.0	25.5	26.1	26.3	26.3	26.4	26.4		
64.0	3	-21.1						-6.0	5.3	5.6	5.6	5.7	5.7	5.7		
65.0	2	-14.3						-14.0	1.5	1.5	1.7	1.7	1.7	1.7		
66.0	2	3.1						3.0	6.4	6.6	6.6	6.6	6.6	6.6		
67.0	2	-1.1						-1.0	0.0	10.2	10.3	10.3	10.4	10.4		
68.0	2	-0.2						0.0	5.4	5.4	5.0	5.0	5.0	5.0		
69.0	2	1.7						2.0	21.5	21.4	21.0	21.0	21.0	21.0		
70.0	2	-1.0						-1.0	32.4	33.0	33.0	33.1	33.2	33.2		

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.5

DATA SOURCE											MAY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)	
5FC	744	-9.0	-8.9	-6.5	-5.1	-3.3	-1.3	0.5	2.8	4.7	5.4	6.2	7.4	8.0		
1.0	744	-13.0		-8.0	-7.7	-6.0	-3.1	0.3	4.1	4.7	4.9	4.9	4.9	4.9		
2.0	744	-12.0		-10.8	-9.0	-7.3	-4.6	-0.7	2.5	4.5	4.5	4.5	4.5	4.5		
3.0	744	-19.0	-15.9	-12.5	-10.4	-8.8	-5.4	-0.9	2.0	4.5	4.5	4.5	4.5	4.5		
4.0	744	-20.0	-16.9	-14.9	-13.5	-10.4	-6.3	-1.4	1.8	4.7	4.5	4.5	4.5	4.5		
5.0	744	-22.0	-20.9	-18.8	-15.0	-11.6	-7.5	-2.3	1.5	4.8	4.5	4.5	4.5	4.5		
6.0	744	-25.0	-22.9	-20.6	-17.4	-14.2	-9.0	-3.3	1.3	4.8	4.5	4.5	4.5	4.5		
7.0	744	-27.0	-24.9	-22.3	-19.8	-15.6	-10.6	-4.0	1.1	4.8	4.5	4.5	4.5	4.5		
8.0	744	-28.0		-24.8	-21.5	-18.1	-12.7	-4.7	1.3	4.5	4.5	4.5	4.5	4.5		
9.0	744	-31.0		-27.7	-24.2	-20.5	-14.9	-5.4	1.4	4.5	4.5	4.5	4.5	4.5		
10.0	744	-42.0		-31.7	-28.5	-24.2	-16.8	-6.4	1.3	4.7	4.5	4.5	4.5	4.5		
11.0	744	-46.0	-45.9	-38.7	-31.8	-26.8	-19.1	-7.0	1.3	4.9	4.5	4.5	4.5	4.5		
12.0	744	-47.0	-45.9	-41.5	-37.0	-30.5	-21.1	-9.3	0.4	4.9	4.5	4.5	4.5	4.5		
13.0	744	-50.0	-47.9	-43.5	-39.5	-33.3	-23.2	-10.9	0.6	5.1	4.9	4.5	4.5	4.5		
14.0	744	-49.0	-44.7	-36.3	-33.8	-29.4	-21.7	-11.3	2.3	4.5	4.5	4.5	4.5	4.5		
15.0	744	-32.0	-31.9	-28.3	-26.7	-23.9	-19.2	-10.6	3.0	4.5	4.5	4.5	4.5	4.5		
16.0	744	-26.0	-25.9	-23.3	-21.1	-19.5	-15.3	-8.9	2.3	4.8	4.5	4.5	4.5	4.5		
17.0	744	-24.0	-21.9	-18.7	-17.2	-14.8	-11.4	-6.3	0.9	4.5	4.5	4.5	4.5	4.5		
18.0	744	-23.0	-16.9	-14.1	-12.8	-10.6	-7.8	-3.7	0.1	2.5	4.4	4.5	4.5	4.5		
19.0	744	-19.0	-16.9	-9.9	-8.4	-7.0	-4.8	-1.1	1.4	3.3	4.4	4.5	4.5	4.5		
20.0	744	-10.0	-8.9	-7.3	-5.1	-5.0	-2.8	-0.3	2.2	4.3	4.5	4.5	4.5	4.5		
21.0	744	-9.0	-7.9	-5.6	-4.6	-3.2	-1.4	0.5	3.6	4.5	4.5	4.5	4.5	4.5		
22.0	744	-9.0	-6.9	-5.1	-3.9	-3.0	-0.9	1.0	4.2	4.5	4.5	4.5	4.5	4.5		
23.0	744	-9.0	-5.9	-4.2	-3.3	-2.3	-0.7	1.7	4.8	4.5	4.5	4.5	4.5	4.5		
24.0	744	-7.0	-6.9	-4.6	-3.5	-2.3	-0.6	1.9	5.3	4.5	4.5	4.5	4.5	4.5		
25.0	744	-7.0		-5.8	-4.3	-2.8	-0.7	2.0	5.4	4.5	4.5	4.5	4.5	4.5		
26.0	744	-10.0	-9.9	-6.5	-4.6	-3.0	-0.8	2.2	5.9	4.5	4.5	4.5	4.5	4.5		
27.0	744	-6.0		-6.9	-5.4	-3.8	-0.9	1.8	5.8	4.5	4.5	4.5	4.5	4.5		
28.0	103	-6.3			-4.4	-4.4	-1.4	3.1	8.3	10.4	11.0	13.0	15.0	15.2	15.4	
29.0	105	-13.3		-8.0	-7.6	-4.4	-4.0	-0.9	3.0	8.4	12.0	14.0	15.0	15.6	15.7	
30.0	105	-10.5		-10.5	-9.6	-5.6	-5.6	-2.1	3.2	7.0	11.0	13.6	15.0	16.1	16.3	
31.0	107	-13.7		-12.0	-11.6	-8.4	-8.4	-3.0	2.6	7.5	10.3	12.3	13.0	13.5	13.6	
32.0	110	-12.2			-10.8	-8.7	-8.4	-3.1	2.7	7.0	10.4	12.3	13.0	15.4	15.5	
33.0	112	-18.1		-14.0	-12.5	-8.4	-8.4	-3.1	2.3	7.0	11.2	12.7	14.0	15.0	15.1	
34.0	113	-12.1		-10.0	-9.7	-8.2	-8.2	-5.3	1.7	6.0	11.2	12.7	14.0	15.0	15.1	
35.0	113	-12.1			-9.0	-9.1	-9.1	-5.0	1.7	6.0	11.2	12.7	14.0	15.0	15.1	
36.0	113	-17.1		-11.0	-10.4	-7.3	-7.3	-4.7	1.8	8.2	10.4	14.0	15.0	15.0	15.0	
37.0	114	-12.2		-10.0	-9.7	-8.5	-8.5	-5.4	1.4	6.5	13.2	14.7	15.3	17.3	17.5	
38.0	112	-23.1		-13.0	-10.7	-8.2	-8.2	-3.7	3.0	9.3	12.0	14.0	15.5	16.1	16.2	
39.0	112	-13.8		-11.0	-10.7	-8.2	-8.2	-2.6	3.0	9.0	13.5	14.7	15.5	16.1	16.1	
40.0	115	-19.5		-12.5	-12.2	-8.1	-8.1	-1.4	3.0	9.8	14.5	15.7	17.0	18.6	19.7	
41.0	116	-17.6		-12.8	-10.4	-5.2	-5.2	-0.4	5.0	10.4	15.1	16.7	17.4	20.4	20.9	
42.0	116	-11.6		-8.4	-7.4	-5.1	-5.1	0.4	6.2	10.4	14.8	14.8	14.8	14.8	14.8	
43.0	113	-5.8		-4.0	-4.0	-0.0	-0.0	0.0	9.0	19.0	19.5	20.5	21.0	23.5	23.5	
44.0	112	-12.6		-4.0	-4.0	-0.4	-0.4	2.3	9.0	19.0	19.5	20.5	21.0	23.5	23.5	
45.0	111	-8.4		-5.0	-4.5	-2.1	-2.1	3.2	10.1	17.1	19.2	21.4	23.4	24.0	24.1	
46.0	104	-8.6		-5.0	-4.4	-1.9	-1.9	2.4	11.0	17.5	22.3	24.5	25.0	25.4	25.4	
47.0	107	-12.7		-6.0	-4.4	-1.3	-1.3	4.5	11.3	18.3	22.0	25.0	25.0	25.4	25.4	
48.0	106	-11.9		-6.0	-4.4	-2.4	-2.4	4.3	11.8	18.4	21.4	23.4	25.0	27.1	27.2	
49.0	104	-19.3		-9.0	-7.4	-1.8	-1.8	4.8	12.1	18.4	21.4	24.4	26.0	27.6	27.7	
50.0	100	-0.2		-9.0	-3.7	0.0	0.0	4.5	13.2	19.0	24.4	27.4	28.0	29.0	30.0	
51.0	94	-15.8		-3.8	-3.8	0.9	0.9	5.2	13.1	20.7	25.1	26.4	31.0	32.0	32.2	
52.0	95	-15.9		-3.8	-3.8	-0.4	-0.4	4.0	12.4	20.9	24.4	25.0	33.0	33.5	33.5	
53.0	90	-21.6		-5.0	-1.5	3.1	3.1	13.5	20.5	25.5	30.0	37.1	38.0	38.1	38.1	
54.0	85	-5.5		-5.1	1.1	5.5	5.5	12.1	19.4	26.4	32.0	37.1	37.4	37.4	37.4	
55.0	74	-4.8		-0.4	-0.1	5.6	5.6	12.3	20.4	31.3	33.7	34.2	34.5	34.5	34.5	
56.0	66	-10.2		-0.6	-3.4	2.4	2.4	12.4	23.2	29.4	33.4	36.2	36.4	36.4	36.4	
57.0	57	-42.1		-0.7	-0.7	4.0	4.0	13.1	23.0	29.2	34.7	36.3	36.7	36.7	36.7	
58.0	43	-33.1			-12.4	4.2	4.2	12.2	22.2	29.4	30.0	30.4	31.0	31.1	31.1	
59.0	33	-21.9			-8.7	1.1	1.1	12.4	21.4	27.0	27.0	27.0	27.0	27.0	27.0	
60.0	20	-22.9			-23.0	4.2	4.2	11.0	21.4	27.0	27.0	27.0	27.0	27.0	27.0	
61.0	12	0.0				4.5	4.5	9.0	25.1	27.4	28.1	28.1	28.1	28.1	28.1	
62.0	9	0.3				3.2	3.2	7.5	18.6	26.3	26.3	26.3	26.3	26.3	26.3	
63.0	2	0.6				1.0	1.0	22.0	23.1	23.0	23.0	23.0	23.0	23.0	23.0	
64.0	2	0.9				1.0	1.0	18.0	19.2	19.0	19.0	19.0	19.0	19.0	19.0	
65.0	2	1.1				1.0	1.0	18.0	15.2	15.2	15.2	15.2	15.2	15.2	15.2	
66.0	1	1.6														
67.0	1	15.5														
68.0	1	27.1														
69.0	1	31.3														
70.0	1															

Positive is wind from the right (150°).
Negative is wind from the left (330°).

21.3
13.6
15.5
31.1
27.5

DATA SOURCE										JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	72.1	-7.0			-5.3	-3.6	-2.6	-0.9	+0.2	+2.9	+4.8	+5.7	+6.5	+7.7	+8.0	
1.0	72.2	-9.0			-7.5	-5.0	-4.4	-2.0	+0.5	+3.7	+5.8	+7.7	+9.4	+19.0	+20.0	
2.0	72.3	-18.0			-8.7	-7.4	-5.1	-2.9	-0.3	+2.5	+5.1	+6.6	+7.9	+22.0	+23.0	
3.0	72.3	-15.7			-9.9	-8.5	-5.8	-3.6	-0.5	+2.3	+5.1	+6.8	+8.4	+20.0	+21.0	
4.0	72.3	-13.0			-10.3	-8.9	-7.5	-4.1	-0.7	+2.1	+4.8	+6.6	+9.4	+21.0	+22.0	
5.0	72.3	-14.0			-10.2	-9.4	-8.1	-5.2	-0.9	+1.8	+5.0	+6.8	+8.9	+19.0	+20.0	
6.0	72.3	-15.0			-11.3	-10.0	-8.6	-5.6	-1.5	+1.5	+4.4	+6.8	+9.9	+21.0	+22.0	
7.0	72.3	-17.0			-13.9	-12.1	-10.0	-6.1	-1.8	+1.5	+4.7	+6.7	+8.9	+22.0	+23.0	
8.0	72.3	-22.0			-17.4	-14.5	-10.7	-6.9	-2.0	+1.8	+5.4	+7.7	+8.9	+22.0	+23.0	
9.0	72.3	-25.0			-20.6	-17.2	-13.2	-8.3	-2.4	+2.3	+5.9	+7.9	+9.9	+19.0	+20.0	
10.0	72.3	-34.0			-24.2	-20.8	-15.6	-9.7	-2.8	+3.0	+7.5	+9.7	+11.4	+18.0	+19.0	
11.0	72.3	-40.0			-28.2	-23.6	-19.1	-11.4	-3.1	+3.3	+8.3	+11.4	+13.4	+18.0	+19.0	
12.0	72.3	-41.0			-31.9	-29.8	-23.7	-13.1	-4.3	+3.0	+8.0	+11.3	+13.4	+22.0	+23.0	
13.0	72.3	-33.0			-36.3	-30.9	-26.0	-15.2	-5.7	+1.9	+7.3	+9.5	+12.9	+19.0	+20.0	
14.0	72.3	-33.0			-32.9	-29.5	-23.0	-15.2	-5.6	+0.3	+4.6	+6.6	+10.2	+15.0	+16.0	
15.0	72.3	-32.0			-28.2	-24.1	-19.8	-13.5	-8.0	+0.3	+3.1	+4.9	+6.5	+14.0	+15.0	
16.0	72.3	-23.0			-18.5	-16.4	-13.6	-9.0	-4.2	+0.2	+3.0	+4.9	+6.6	+15.0	+16.0	
17.0	72.3	-15.0			-12.5	-10.9	-8.7	-5.8	-1.9	+0.9	+4.0	+4.9	+6.4	+12.0	+13.0	
18.0	72.3	-9.0			-7.7	-6.6	-4.9	-2.9	-0.2	+2.4	+4.7	+5.8	+6.9	+10.5	+11.0	
19.0	72.3	-10.7			-4.9	-3.5	-2.4	-0.7	+1.3	+4.0	+5.9	+7.4	+8.3	+10.0	+11.0	
20.0	72.3	-12.0			-3.1	-1.9	-0.9	-0.1	+2.5	+5.1	+7.0	+8.1	+9.1	+13.0	+14.0	
21.0	72.3	-10.0			-2.5	-1.6	-0.8	+0.5	+3.4	+6.7	+8.6	+9.8	+10.7	+13.0	+14.0	
22.0	72.3	-10.0			-2.6	-1.5	-0.7	+0.8	+4.5	+7.7	+9.7	+10.6	+11.5	+13.5	+14.0	
23.0	72.3	-11.0			-2.8	-1.6	-0.7	+0.3	+1.6	+5.1	+8.2	+9.9	+11.0	+11.8	+14.5	
24.0	72.3	-9.0			-0.9	-0.7	-0.1	+2.1	+5.4	+8.4	+10.4	+11.4	+12.2	+14.0	+15.0	
25.0	72.3	-8.0			-1.9	-0.7	-0.1	+2.2	+5.5	+8.7	+10.5	+11.6	+12.9	+15.7	+16.0	
26.0	72.3	-5.0			-1.7	-0.7	-0.2	+2.1	+5.5	+8.9	+11.5	+12.8	+14.6	+24.0	+25.0	
27.0	72.3	-6.0			-1.8	-1.0	-0.4	+1.8	+5.8	+9.0	+11.7	+13.0	+14.1	+16.5	+17.0	
28.0	103	-1.5			-0.4		2.7	7.5	11.0	13.0	15.0	16.0	16.7	16.9		
29.0	104	-3.5			-3.0	-1.2	0.1	3.1	7.3	11.1	13.4	15.7	16.0	17.0	18.1	
30.0	107	-3.8			-3.0	-2.5	1.1	4.0	7.0	11.3	15.2	17.7	18.0	19.4	19.7	
31.0	104	-0.7			0.0	0.3	0.9	4.1	8.2	11.0	15.7	16.0	17.0	21.0	21.2	
32.0	109	-0.6			-3.0	-2.5	1.4	4.4	8.2	12.4	16.0	16.5	17.0	22.0	22.4	
33.0	103	-2.5			-1.5	-1.5	1.2	4.0	8.3	11.7	14.4	16.5	17.0	21.0	21.4	
34.0	110	-5.2			-2.0	-1.5	0.4	3.0	7.8	13.4	15.4	16.0	17.0	19.4	19.5	
35.0	111	-2.5			-1.5	-1.5	0.4	3.0	7.7	13.2	16.2	17.7	18.5	19.0	19.1	
36.0	111	-3.8			-3.7	-2.5	-0.5	3.5	8.2	13.2	16.2	17.7	18.5	19.0	19.1	
37.0	110	-2.7			-1.0	-1.2	1.8	5.2	8.7	16.4	18.3	18.0	20.0	25.4	25.7	
38.0	110	-1.4			0.0	0.4	1.3	6.1	11.0	17.4	19.4	19.0	22.0	27.6	27.7	
39.0	110	-4.0			1.1	3.3	4.5	6.4	11.4	16.4	20.3	23.0	25.0	29.4	29.4	
40.0	110	0.2			3.0	3.5	4.5	6.0	11.3	17.4	21.5	23.0	25.0	25.0	25.3	
41.0	110	-0.3			-1.0	-0.5	4.2	8.1	12.4	18.3	20.4	24.0	25.0	25.0	27.0	
42.0	109	1.3			2.1	3.5	4.8	8.1	14.1	19.3	22.5	25.3	27.7	27.5	27.7	
43.0	109	1.5			2.1	4.2	5.7	10.8	15.5	21.4	25.3	27.7	28.0	29.4	29.0	
44.0	109	5.5			7.2	8.1	9.1	11.4	17.2	24.4	27.9	28.0	29.0	29.4	29.5	
45.0	109	5.8				7.7	9.1	12.8	19.0	24.4	28.0	30.0	31.5	34.0	34.0	
46.0	104	3.5			6.0	6.7	9.1	13.2	21.0	26.4	31.4	34.0	37.0	40.2	40.4	
47.0	107	0.5			4.1	9.2	11.5	15.0	23.1	29.0	33.3	35.4	35.0	36.0	37.0	
48.0	101	0.5			5.0	7.3	11.1	17.0	24.4	30.5	35.0	36.0	40.0	41.5	43.7	
49.0	100	2.0			2.0	10.3	12.3	17.4	24.4	33.2	36.0	37.7	39.0	40.7	49.4	
50.0	92	1.2				7.1	13.2	17.5	25.0	33.4	37.2	39.0	44.1	45.0	45.2	
51.0	83	7.0				7.5	11.7	16.7	25.0	33.4	37.4	40.0	47.1	47.7	47.4	
52.0	80	5.7				8.3	9.0	16.4	25.1	34.4	38.3	40.0	46.1	46.5	46.5	
53.0	75	6.7				8.4	9.4	15.0	25.0	34.5	39.4	44.0	47.3	47.9	48.1	
54.0	73	0.3				3.7	7.7	15.4	25.5	33.5	39.4	44.0	47.3	47.9	48.1	
55.0	70	-4.5				1.4	9.3	15.1	25.0	33.4	39.4	42.0	47.3	48.0	48.1	
56.0	66	4.4				6.5	8.3	15.5	23.0	30.3	41.0	45.0	48.3	48.0	49.0	
57.0	62	-5.6				6.2	8.1	12.8	23.2	33.4	43.0	46.4	52.4	52.0	53.0	
58.0	52	-3.8				-0.2		14.6	24.3	32.0	40.4	43.8	47.4	47.7	47.7	
59.0	40	-24.7				-8.0		11.3	23.7	32.2	35.0	39.1	39.7	40.1	40.1	
60.0	31	-0.1				5.6		12.0	23.5	35.0	39.5	41.0	41.4	41.5	41.5	
61.0	23	-0.9				-2.0		4.4	21.5	32.4	35.0	45.4	46.0	46.3	46.3	
62.0	14	-7.4						2.2	15.0	43.8	50.2	50.6	50.7	50.8	50.8	
63.0	6	10.5							15.0	48.0	48.4	48.4	48.4	48.4	48.4	
64.0	2	21.4							21.0	22.4	22.5	22.5	22.5	22.5	22.5	
65.0	2	17.4							17.0	30.5	34.4	34.7	34.7	34.7	34.7	
66.0	1	12.4													12.4	
67.0	1	0.2													9.2	
68.0	1	6.3													6.3	

Positive is wind from the right (150°).
Negative is wind from the left (330°).

DATA SOURCE							JULY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	CUMULATIVE PERCENTAGE FREQUENCY												
				0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)
SFC	744	-6.0			-3.7	-2.8		-1.8	-0.7	+0.5	+2.7	+4.1	+5.4	+6.3	+7.6	+8.0
1.0	744	-10.0		-8.9	-8.0	-5.7		-4.3	-1.3	+0.9	+4.3	+6.8	+8.3	+11.1	+14.4	+15.0
2.0	744	-11.0		-8.9	-6.6	-5.7	-4.5	-2.2	-0.0	+3.0	+6.2	+7.9	+9.8	+14.9	+16.0	
3.0	744	-10.0		-9.7	-7.6	-6.0	-4.0	-2.5	-0.2	+2.7	+5.6	+7.6	+8.9	+11.9	+13.0	
4.0	744	-11.0			-9.1	-7.4	-5.9	-3.3	-0.2	+2.8	+5.7	+7.3	+9.5	+11.6	+12.0	
5.0	744	-12.0		-11.7	-9.9	-8.4	-6.2	-3.5	-0.4	+2.9	+6.1	+7.5	+8.4	+12.4	+13.0	
6.0	744	-17.0		-12.7	-11.3	-9.0	-6.8	-4.1	-0.4	+3.1	+6.3	+8.0	+9.7	+11.9	+20.0	
7.0	744	-13.0			-9.8	-8.4	-6.9	-4.3	-0.5	+3.2	+6.4	+8.2	+10.5	+13.4	+14.0	
8.0	744	-15.0		-14.9	-10.3	-9.3	-7.2	-4.5	-0.6	+3.0	+6.4	+8.9	+11.1	+16.4	+17.0	
9.0	744	-17.0		-14.7	-11.6	-9.7	-7.9	-5.2	-0.7	+3.0	+7.5	+9.8	+13.5	+17.9	+19.0	
10.0	744	-17.0		-15.7	-11.5	-10.3	-8.8	-6.0	-1.0	+2.9	+7.8	+10.5	+12.8	+21.9	+31.0	
11.0	744	-20.0		-17.7	-13.3	-11.6	-9.6	-6.7	-1.5	+3.2	+7.9	+12.2	+15.5	+30.9	+34.0	
12.0	744	-23.0		-19.9	-16.3	-14.0	-11.6	-7.5	-1.9	+2.8	+8.8	+12.8	+20.2	+29.9	+32.0	
13.0	744	-22.0		-21.9	-17.5	-15.9	-13.6	-8.9	-2.6	+2.8	+8.7	+15.0	+17.5	+29.9	+39.0	
14.0	744	-23.0		-17.7	-18.1	-15.7	-13.1	-8.4	-2.4	+2.3	+7.4	+11.2	+17.2	+27.9	+29.0	
15.0	744	-18.0		-15.9	-12.9	-11.7	-9.9	-6.2	-1.4	+2.4	+6.1	+8.3	+10.9	+18.9	+20.0	
16.0	744	-12.0		-11.7	-9.1	-7.6	-5.9	-3.5	-0.4	+2.8	+4.9	+6.6	+7.8	+10.9	+12.0	
17.0	744	-7.0			-6.4	-5.5	-4.0	-1.7	+0.5	+3.5	+5.4	+6.3	+7.5	+8.9	+10.0	
18.0	744	-5.0		-4.7	-3.6	-2.6	-1.5	-0.3	+2.1	+4.9	+6.9	+8.3	+9.4	+10.9	+12.0	
19.0	744	-3.0		-2.9	-1.5	-0.9	-0.4	+0.4	+3.5	+6.0	+7.7	+8.6	+9.3	+11.9	+14.0	
20.0	744	-7.0		-3.9	-0.9	-0.4	+0.5	+2.3	+4.8	+7.3	+8.9	+9.9	+11.7	+13.9	+16.0	
21.0	744	-1.0			-0.7	-0.4	+0.5	+2.9	+6.0	+9.4	+11.6	+12.9	+13.9	+15.9	+19.0	
22.0	744	-19.0		-3.9	+0.0	+0.7	+1.6	+3.5	+6.9	+10.4	+12.6	+13.7	+14.7	+15.9	+17.0	
23.0	744	-5.0		-4.9	+0.0	+1.3	+2.3	+4.3	+7.5	+10.9	+13.2	+14.1	+15.0	+16.4	+17.0	
24.0	744	-13.0		-1.9	-0.0	+2.2	+3.3	+5.1	+8.0	+11.0	+13.1	+14.3	+15.4	+18.9	+20.0	
25.0	744	+0.0			+0.8	+2.2	+3.2	+5.2	+8.0	+11.1	+13.5	+15.0	+16.2	+18.9	+21.0	
26.0	744	+4.0		-2.9	+0.1	+1.8	+2.9	+5.1	+8.2	+11.6	+14.6	+15.8	+16.9	+20.9	+22.0	
27.0	744	+7.0		-6.9	-0.1	+1.4	+2.7	+5.3	+8.2	+12.0	+14.8	+16.0	+17.8	+19.9	+23.0	
28.0	106	6.0				0.4	2.4	5.4	8.4	12.4	14.4	16.4	17.0	17.4	17.7	
29.0	108	3.5			3.5	5.5	8.5	11.5	14.5	18.5	19.5	20.5	20.8	20.9	20.9	
30.0	111	3.8				4.1	4.7	6.6	10.6	15.6	17.6	18.6	19.2	20.0	25.1	
31.0	112	2.3			2.4	3.4	4.5	7.4	11.4	16.4	18.4	19.4	20.4	21.3	21.4	
32.0	114	4.2			4.2	4.4	5.1	7.7	12.3	15.6	18.6	20.9	20.9	23.4	23.9	
33.0	117	-5.3			1.2	2.7	5.0	8.4	11.7	16.4	18.3	21.9	21.9	23.2	23.4	
34.0	121	1.9				2.4	5.0	7.6	12.5	17.2	20.0	21.6	22.4	24.4	24.9	
35.0	122	1.9			2.2	3.4	5.2	7.0	11.7	16.2	21.4	22.1	22.9	27.0	29.1	
36.0	122	2.0				4.4	5.6	9.2	14.8	19.7	21.0	22.6	23.4	27.4	29.0	
37.0	122	1.3			2.2	4.4	6.7	9.7	14.4	19.4	22.0	23.1	23.9	25.7	25.9	
38.0	124	-17.7			1.2	3.4	6.1	9.7	15.7	20.3	23.2	26.2	28.4	29.3	29.4	
39.0	126	0.9				3.4	7.3	11.5	16.5	21.4	25.4	26.7	28.4	29.5	29.5	
40.0	126	3.0			3.3	7.4	9.8	12.2	17.0	21.4	24.7	27.1	27.0	30.5	30.7	
41.0	126	-0.7			1.3	4.4	7.3	11.6	17.7	22.4	26.3	28.1	29.0	31.4	31.9	
42.0	124	5.8				7.4	9.1	12.4	19.3	23.2	26.3	29.2	30.8	32.7	32.9	
43.0	126	4.2			6.1	6.4	7.4	13.1	19.5	24.4	29.3	33.1	33.0	34.5	34.6	
44.0	129	5.9			6.1	6.4	8.4	15.4	20.9	27.0	32.0	35.2	35.8	37.4	37.4	
45.0	121	5.2			6.2	8.4	10.0	15.2	24.8	31.2	37.0	40.1	40.7	41.1	41.2	
46.0	119	7.2				7.7	11.0	18.0	26.4	32.7	37.6	41.4	42.4	42.7	42.7	
47.0	114	3.8			4.1	8.4	11.0	19.0	28.0	33.4	39.0	40.9	41.4	44.4	44.7	
48.0	117	1.7			9.1	9.4	13.0	21.4	29.4	35.4	42.1	44.0	44.0	47.5	47.5	
49.0	116	3.4			4.2	10.6	14.4	23.4	30.1	36.9	43.5	44.2	45.0	46.5	46.6	
50.0	113	11.2			11.3	12.2	13.7	25.4	30.4	39.2	43.4	45.7	47.4	47.4	47.4	
51.0	110	4.5			10.1	11.5	14.6	23.4	30.7	37.5	42.5	45.7	47.0	49.0	50.1	
52.0	104	4.2			5.1	9.5	12.2	21.4	30.7	39.0	44.4	46.0	49.0	50.7	50.4	
53.0	103	6.0				9.3	12.1	19.7	29.6	39.5	46.3	49.7	51.0	55.0	55.2	
54.0	97	-6.6				7.2	9.0	18.4	28.4	39.4	46.1	50.8	50.0	59.4	59.4	
55.0	89	-11.9				6.0	6.8	15.4	29.9	40.5	47.5	49.0	50.1	59.5	59.5	
56.0	84	-11.5				-11.1	6.2	13.4	30.4	39.4	45.4	52.1	55.1	55.7	55.4	
57.0	77	-14.2				-4.2	3.8	13.5	29.5	39.7	47.2	49.2	52.2	52.0	53.0	
58.0	66	-14.9				3.5	4.7	15.1	27.5	36.4	43.0	50.4	51.3	51.9	52.0	
59.0	56	-5.8				-5.7	-5.1	11.9	25.5	39.1	47.2	49.7	49.4	50.3	50.4	
60.0	41	-25.6					0.0	12.5	27.3	41.5	49.0	50.4	50.4	51.1	51.2	
61.0	25	-52.6					5.3	12.0	35.5	45.0	47.4	51.4	51.4	52.0	52.0	
62.0	14	-24.7						13.0	32.0	41.5	46.5	51.1	51.0	51.5	51.5	
63.0	11	18.9						20.7	36.4	43.3	48.4	48.0	45.1	45.3	45.3	
64.0	9	9.7						18.4	30.5	44.5	47.4	48.1	48.1	49.4	49.4	
65.0	9	13.9							31.5	37.4	51.3	51.4	51.4	51.4	51.4	
66.0	5	9.9							28.5	44.1	48.4	48.4	48.5	44.5	44.5	
67.0	4	25.7							27.0	44.4	48.4	48.0	45.0	45.0	45.0	
68.0	4	2.1							11.5	40.2	40.2	41.0	41.1	41.1	41.2	
69.0	5	-6.9							10.5	35.1	35.1	35.4	35.4	35.4	35.6	
70.0	5	7.9							19.5	25.1	25.5	25.4	25.4	25.4	25.5	

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.8

DATA SOURCE											AUGUST				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
SFC	744	-7.0		-5.9	-3.9	-3.4	-2.5	-0.9	-3.0	+1.7	+3.3	+4.3	+5.1	+5.9	+8.0
1.0	744	-10.0		-8.7	-6.8	-6.0	-4.5	-1.6	+0.8	+3.6	+5.7	+7.3	+8.5	+13.9	+17.0
2.0	744	-9.0		-8.7	-6.5	-5.6	-4.4	-2.3	-0.1	+2.8	+5.0	+6.2	+7.5	+12.9	+15.0
3.0	744	-11.0		-4.7	-6.7	-5.7	-4.6	-2.7	-0.2	+2.3	+4.9	+6.4	+7.7	+10.9	+15.0
4.0	744	-7.0			-6.5	-5.8	-4.7	-2.3	+0.2	+2.8	+5.4	+7.4	+8.5	+9.9	+16.0
5.0	744	-8.0			-7.7	-6.3	-5.2	-3.0	-0.3	+3.0	+5.8	+7.7	+9.5	+14.9	+16.0
6.0	744	-10.0			-8.2	-6.8	-5.9	-3.4	-0.4	+2.7	+5.6	+7.6	+9.5	+12.9	+17.0
7.0	744	-11.0			-9.3	-7.6	-5.7	-3.7	-0.4	+3.1	+5.8	+7.7	+8.8	+12.9	+19.0
8.0	744	-11.0			-10.2	-8.7	-7.3	-4.3	-0.8	+3.1	+6.0	+7.5	+9.3	+12.9	+22.0
9.0	744	-15.0			-11.8	-9.5	-7.6	-4.7	-1.8	+3.2	+6.1	+8.2	+9.7	+14.9	+22.0
10.0	744	-17.0		-13.7	-11.4	-9.3	-5.9	-3.9	-0.9	+3.6	+7.2	+9.1	+10.9	+21.9	+26.0
11.0	744	-20.0		-19.9	-16.1	-13.2	-11.1	-7.6	-1.0	+4.0	+8.3	+10.5	+13.7	+25.4	+28.0
12.0	744	-23.0		-21.7	-17.7	-15.8	-12.5	-7.7	-1.6	+3.7	+9.7	+12.5	+15.7	+25.9	+28.0
13.0	744	-23.0		-21.7	-19.3	-16.6	-14.0	-8.8	-2.4	+3.0	+8.9	+13.0	+16.5	+23.9	+25.0
14.0	744	-22.0			-16.3	-14.0	-11.8	-3.0	-1.9	+2.3	+6.7	+10.1	+11.8	+18.9	+25.0
15.0	744	-15.0		-13.7	-10.5	-8.3	-7.7	-5.3	-1.0	+2.0	+5.6	+7.1	+9.7	+14.4	+15.0
16.0	744	-9.0			-7.5	-6.4	-4.7	-2.8	-0.2	+2.7	+4.7	+5.8	+7.1	+10.9	+12.0
17.0	744	-6.0		-5.7	-4.3	-3.9	-2.9	-0.7	+1.0	+3.7	+5.4	+6.9	+8.3	+9.9	+15.0
18.0	744	-5.0		-4.7	-3.3	-2.2	-1.0	-0.2	+2.4	+5.2	+7.0	+8.0	+9.1	+11.9	+16.0
19.0	744	-2.0			-3.7	-0.7	-0.2	+1.3	+3.6	+6.1	+8.0	+9.1	+10.1	+11.9	+14.0
20.0	744	-3.0		-2.9	-0.3	+1.1	+2.5	+5.2	+7.8	+9.3	+10.1	+10.8	+13.9	+15.0	+15.0
21.0	744	-2.0		-0.7	-0.2	+0.6	+1.5	+3.2	+6.1	+8.9	+10.7	+11.8	+12.7	+14.4	+15.0
22.0	744	+0.0			+1.0	+1.7	+3.8	+7.0	+9.9	+11.6	+12.9	+13.9	+16.9	+19.0	+19.0
23.0	744	+1.0		-0.7	+1.3	+1.6	+2.4	+4.6	+7.5	+10.5	+12.6	+13.6	+15.0	+15.9	+20.0
24.0	744	+0.0			+1.2	+2.0	+3.1	+5.0	+7.7	+11.0	+12.7	+13.7	+15.3	+19.4	+20.0
25.0	744	+0.0			+0.8	+2.4	+3.4	+5.1	+8.1	+11.5	+13.9	+14.5	+16.6	+16.9	+18.0
26.0	744	-7.0		-1.9	+0.7	+1.8	+3.0	+5.0	+8.1	+11.4	+13.5	+15.1	+16.4	+16.9	+18.0
27.0	744	+0.0			+1.2	+2.1	+2.7	+4.3	+7.7	+11.7	+14.2	+15.7	+16.6	+20.9	+23.0
28.0	110	2.8					4.2	5.0	6.5	12.4	15.4	16.7	17.1	17.4	17.5
29.0	113	-2.3				2.6	3.5	6.4	10.3	14.2	15.6	18.7	19.0	22.0	22.2
30.0	113	-6.2			3.0	3.5	4.8	7.0	11.3	14.6	16.1	18.0	19.0	20.4	20.5
31.0	115	2.9				3.2	4.7	7.8	11.4	15.0	16.6	19.7	20.4	21.2	21.1
32.0	115	3.7					4.8	6.8	11.5	15.2	18.4	20.0	21.0	23.5	26.4
33.0	115	1.2			3.1	3.8	5.4	7.8	12.1	15.5	18.3	19.0	19.0	24.6	29.7
34.0	117	-1.4			2.2	4.7	5.6	7.3	11.7	16.1	20.1	23.3	31.0	35.7	35.8
35.0	118	-4.2			-1.8	-0.3	1.7	6.7	12.1	17.7	21.1	23.3	24.4	25.0	25.1
36.0	118	-7.2			-5.8	-1.3	3.0	7.2	12.6	17.7	21.4	23.3	23.0	25.4	26.0
37.0	120	0.6				1.2	2.6	7.0	13.3	18.1	22.2	22.0	24.5	25.3	25.4
38.0	120	-14.4			-1.8	1.4	3.3	7.2	14.2	19.8	22.0	22.0	23.4	24.4	24.4
39.0	120	-2.2			-1.0	-1.1	1.7	8.2	14.2	19.3	23.5	25.1	25.0	25.7	26.4
40.0	119	-1.0				1.1	1.8	7.1	13.1	19.5	25.3	25.3	27.4	31.7	31.4
41.0	117	-0.1				0.7	2.0	6.4	13.2	20.1	25.2	25.0	27.4	29.6	29.7
42.0	117	-22.4			0.2	2.7	4.3	7.0	14.5	20.6	24.6	25.3	28.4	29.6	29.7
43.0	117	0.3			2.1	2.4	5.0	8.4	15.4	21.7	27.4	28.4	29.4	33.0	33.2
44.0	115	-5.4			1.0	1.3	2.0	10.5	17.0	24.5	30.1	32.2	32.0	33.4	33.9
45.0	118	-0.7			-0.6	-0.2	5.3	10.7	19.5	27.6	31.3	37.4	38.3	38.7	38.4
46.0	113	-3.1			-2.0	-2.2	4.8	12.3	20.5	28.4	32.4	35.7	42.0	44.5	44.5
47.0	110	-0.4				2.3	3.8	10.7	22.1	22.3	37.4	39.5	47.0	52.3	52.5
48.0	110	-4.1				4.3	6.2	11.6	21.0	30.4	34.3	38.4	41.0	51.4	51.0
49.0	108	-3.6			-2.0	-1.5	2.2	8.0	20.5	30.4	34.3	35.8	39.3	46.4	46.0
50.0	105	-7.8			-2.0	3.4	5.4	10.3	19.4	29.4	37.4	38.4	41.0	48.4	49.0
51.0	105	-7.6			-6.0	-1.8	5.1	11.8	20.6	30.1	39.4	44.0	47.0	49.4	49.5
52.0	98	-33.4				3.2	5.0	10.8	20.1	31.2	43.1	45.0	50.0	50.4	50.4
53.0	96	-6.1				1.5	2.9	11.2	18.3	29.4	37.2	40.4	68.0	68.4	68.4
54.0	91	-10.6				0.0	1.5	9.7	17.5	29.3	33.5	35.0	82.1	92.4	92.7
55.0	83	-20.4				-11.1	-7.4	7.7	17.0	25.0	31.0	39.1	85.1	95.7	85.4
56.0	75	-11.4					-8.2	2.0	16.9	25.4	37.1	43.3	58.3	59.2	59.3
57.0	61	-12.6				-12.4	-9.5	-0.3	14.5	24.5	41.0	44.7	45.1	45.3	45.8
58.0	48	-19.9				-18.4	-10.6	0.6	13.5	31.4	47.3	48.0	52.4	52.4	52.4
59.0	37	-26.2					-21.1	-0.1	11.5	29.1	44.2	45.2	45.0	45.4	46.4
60.0	27	-29.7					-21.6	2.3	18.4	34.7	47.7	51.3	51.4	51.4	51.4
61.0	27	-26.0					-18.4	-1.7	17.5	27.7	50.7	54.2	56.4	56.5	56.5
62.0	19	-13.6						-1.0	12.8	24.0	50.1	50.4	50.0	51.0	51.1
63.0	16	-6.2						-2.7	11.0	27.5	35.2	36.4	36.4	36.0	36.9
64.0	10	-4.8						-6.4	11.5	32.4	36.4	36.4	36.7	36.8	36.4
65.0	4	-1.4						0.3	11.5	16.7	27.4	28.2	28.3	28.4	28.4
66.0	7	3.7							0.5	30.0	33.4	33.4	33.4	33.7	33.7
67.0	6	3.4							17.0	34.0	36.5	36.4	36.4	36.4	36.7
68.0	5	0.4							5.5	16.0	17.3	17.4	17.4	17.5	17.5
69.0	4	4.6							0.0	10.3	10.7	10.0	10.0	10.0	10.0
70.0	4	4.3							11.0	20.2	20.4	20.4	20.4	20.4	20.7

Positive is wind from the right (150°).
Negative is wind from the left (330°).

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.9

DATA SOURCE										SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM BBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-11.0			-7.8	-5.3	-3.5	-1.6	-0.1	+1.9	+3.4	+4.9	+5.8	+8.0	+9.0	
1.0	720	-32.0			-10.2	-7.7	-5.6	-2.7	+0.9	+4.3	+7.0	+9.1	+11.4	+29.0	+30.0	
2.0	720	-31.0			-9.6	-7.2	-5.7	-3.1	-0.2	+3.7	+7.0	+9.7	+10.9	+33.0	+34.0	
3.0	720	-33.0			-9.7	-7.5	-5.9	-3.3	-0.4	+3.5	+6.2	+9.4	+11.4	+34.0	+35.0	
4.0	720	-26.0			-8.0	-7.5	-6.0	-3.5	-0.5	+2.8	+6.3	+7.8	+11.2	+30.0	+31.0	
5.0	720	-25.0			-9.9	-8.2	-6.6	-4.0	-0.0	+2.7	+6.1	+8.1	+10.6	+26.0	+27.0	
6.0	720	-24.0			-10.9	-9.5	-7.4	-4.6	-0.6	+2.6	+6.4	+8.8	+13.2	+26.0	+27.0	
7.0	720	-20.0			-12.9	-10.5	-8.0	-4.9	-0.7	+2.6	+6.0	+8.9	+11.7	+28.0	+29.0	
8.0	720	-20.0			-13.8	-11.4	-8.8	-5.5	-1.1	+2.7	+6.4	+9.1	+10.9	+27.0	+28.0	
9.0	720	-21.0			-14.9	-12.9	-10.8	-6.6	-1.3	+2.7	+6.0	+9.6	+11.9	+18.0	+19.0	
10.0	720	-21.0			-16.9	-15.4	-13.1	-8.1	-2.1	+2.9	+7.1	+9.4	+12.8	+25.0	+26.0	
11.0	720	-26.0			-20.9	-17.8	-15.0	-10.1	-2.7	+2.8	+8.0	+11.3	+15.2	+20.0	+21.0	
12.0	720	-35.0			-25.1	-23.1	-18.7	-11.7	-3.0	+2.8	+7.0	+10.9	+15.8	+20.0	+21.0	
13.0	720	-39.0			-30.7	-29.8	-20.4	-13.1	-4.0	+2.8	+7.7	+10.6	+14.2	+22.0	+23.0	
14.0	720	-40.0			-28.3	-25.2	-19.5	-12.0	-4.1	+1.8	+7.6	+11.5	+15.9	+24.0	+25.0	
15.0	720	-23.0			-20.5	-18.1	-14.1	-9.3	-3.0	+1.5	+6.6	+10.8	+15.4	+31.0	+32.0	
16.0	720	-17.0			-11.9	-10.7	-9.5	-5.9	-2.0	+1.0	+5.6	+8.0	+10.9	+16.0	+17.0	
17.0	720	-12.0			-8.8	-7.6	-5.9	-3.3	-0.4	+2.5	+5.3	+7.3	+9.9	+11.6	+12.0	
18.0	720	-6.0			-6.1	-4.7	-3.9	-1.8	+0.3	+3.4	+5.2	+7.2	+8.4	+10.0	+11.0	
19.0	720	-6.0			-4.3	-3.0	-2.2	-0.6	+1.4	+4.2	+6.2	+7.0	+7.8	+9.5	+10.0	
20.0	720	-5.0			-3.1	-2.0	-0.9	+0.1	+2.7	+5.2	+7.0	+7.9	+8.7	+15.0	+16.0	
21.0	720	-4.0			-1.3	-0.8	-0.4	+1.0	+3.5	+6.5	+8.3	+9.4	+10.1	+15.0	+16.0	
22.0	720	-3.0			-1.2	-0.7	-0.0	+1.4	+4.4	+7.1	+9.0	+10.1	+11.6	+15.0	+16.0	
23.0	720	-5.0			-1.3	-0.7	-0.0	+2.0	+4.7	+7.5	+9.2	+10.0	+10.9	+13.0	+14.0	
24.0	720	-5.0			-0.9	-0.6	+0.1	+2.0	+4.7	+7.6	+9.4	+10.4	+11.3	+12.6	+13.0	
25.0	720	-12.0			-0.9	-0.5	+0.1	+1.3	+4.6	+7.8	+10.4	+11.5	+12.7	+15.5	+16.0	
26.0	720	-2.0			-0.9	-0.6	+0.0	+1.4	+4.0	+7.9	+10.5	+11.9	+13.4	+15.0	+16.0	
27.0	720	-13.0			-2.7	-1.5	-0.6	+1.3	+4.0	+8.2	+10.9	+12.6	+13.9	+20.0	+21.0	
28.0	104	-2.2			-2.0	-1.3	1.1	3.0	5.3	9.0	10.9	12.4	13.0	19.4	19.9	
29.0	107	-0.6			0.0	0.7	1.3	2.9	5.3	9.1	12.7	16.4	17.0	20.0	20.9	
30.0	104	-5.0			-3.0	-2.4	-0.9	1.2	5.4	9.5	12.6	14.4	14.0	19.4	19.9	
31.0	104	-7.1			-4.0	-3.4	0.1	2.4	5.4	10.4	13.9	15.4	15.4	17.4	17.9	
32.0	104	-12.8			-4.0	-3.5	-1.2	1.7	5.5	11.4	13.4	15.4	15.4	17.4	17.9	
33.0	104	-4.8			-1.9	-1.1	2.1	6.0	10.9	12.9	14.4	15.4	15.4	16.9	17.0	
34.0	104	-5.2			-4.5	-3.4	0.6	4.4	10.4	12.9	14.4	15.4	15.4	17.4	17.9	
35.0	104	-15.1			-7.0	-6.5	-3.6	-0.4	5.2	10.6	13.4	15.4	15.4	16.9	17.0	
36.0	104	-13.6			-7.0	-6.3	-4.3	-1.2	4.3	10.6	13.9	17.4	20.0	22.4	23.0	
37.0	107	-13.9			-9.0	-7.6	-4.5	-0.3	4.4	10.0	15.4	17.4	18.4	25.4	25.5	
38.0	104	-9.4			-7.4	-5.9	-3.7	-0.2	4.3	10.4	12.9	15.4	20.0	25.4	27.1	
39.0	104	-12.4			-11.0	-9.4	-7.4	-1.1	5.3	10.6	15.7	18.4	19.4	22.9	22.4	
40.0	104	-15.6			-9.0	-8.3	-4.9	-0.4	5.1	11.1	15.7	19.4	21.0	23.1	23.3	
41.0	102	-12.7			-12.0	-10.7	-5.0	-1.6	5.0	11.9	18.4	19.7	21.0	24.4	24.9	
42.0	102	-11.4			-10.7	-8.0	-3.3	-1.4	5.1	12.5	17.0	23.4	24.0	26.4	26.5	
43.0	100	-11.2			-10.7	-8.0	-3.3	-1.4	5.1	14.1	21.0	24.4	25.4	30.4	30.5	
44.0	99	-10.8			-10.4	-10.0	-2.6	-0.4	5.4	15.4	20.5	22.7	24.4	29.0	29.1	
45.0	95	-13.7			-10.4	-8.2	-2.7	-0.7	4.7	14.0	20.4	25.0	29.0	29.4	29.7	
46.0	94	-0.7			-8.0	-5.7	-1.1	-0.1	6.0	12.4	20.3	25.0	39.1	40.2	40.4	
47.0	84	-14.3			-9.0	-5.7	0.3	0.3	6.0	14.4	20.7	24.0	29.1	29.4	29.7	
48.0	85	-7.8			-6.4	-6.2	0.1	0.1	5.5	15.2	20.4	25.1	25.1	25.9	26.0	
49.0	81	-10.1			-9.1	-6.8	-0.4	-0.4	6.7	15.4	19.7	22.4	25.1	25.7	25.4	
50.0	81	-10.9			-10.2	-6.6	-0.4	-0.4	6.5	14.1	21.0	24.4	24.4	25.4	25.5	
51.0	76	-4.2			-7.3	-6.5	-2.6	-0.4	7.5	16.4	23.4	24.4	25.4	35.4	36.0	
52.0	66	-16.6			-9.5	-4.7	-1.5	-0.4	7.5	16.4	23.4	24.4	25.4	35.4	36.0	
53.0	61	-10.1			-8.4	-5.0	-0.3	-0.3	6.5	17.7	24.0	25.4	26.4	26.4	26.7	
54.0	54	-14.5			-12.7	-9.1	-3.4	-0.4	6.5	17.4	23.7	24.4	25.1	25.4	25.5	
55.0	55	-16.2			-15.7	-12.2	-5.1	-0.2	5.2	14.4	23.4	27.7	29.3	29.4	29.7	
56.0	46	-16.1			-15.0	-13.7	-4.7	-0.4	5.6	13.7	19.9	21.0	27.3	27.6	27.5	
57.0	37	-20.6			-11.1	-8.1	-6.1	-0.9	2.6	12.7	16.4	24.1	24.4	24.4	24.6	
58.0	31	-26.9			-21.4	-17.8	-11.4	-6.1	0.0	13.1	21.5	24.0	24.4	24.4	24.6	
59.0	20	-14.1			-14.0	-11.4	-8.0	-4.0	0.0	13.1	21.5	24.0	24.4	24.4	24.6	
60.0	12	-30.1							-11.1	1.0	9.4	15.0	24.0	25.1	25.4	
61.0	4	-45.0							-3.7	1.0	4.9	8.4	11.4	11.4	11.4	
62.0	6	-65.7								5.0	9.1	9.0	9.0	9.0	9.0	
63.0	6	-84.1								-5.5	7.0	7.4	7.0	7.0	7.0	
64.0	2	-5.9								-6.0	15.4	15.0	15.1	15.1	15.2	
65.0	1	-45.9														
66.0	1	-59.7														
67.0	1	-63.4														
68.0	1	-33.6														
69.0	1	-20.3														
70.0	1	-1.5														

Positive is wind from the right (150°).
Negative is wind from the left (330°).

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.10

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	744	-11.0			-8.9	-7.6		-5.6	-3.4	-0.0	+1.3	+2.9	+3.9	+5.1	+6.9	+8.0
1.0	744	-15.0			-12.3	-10.5		-8.1	-5.6	-3.7	+2.9	+6.2	+8.4	+9.5	+10.9	+13.0
2.0	744	-15.0			-11.9	-10.0		-8.3	-5.8	-3.9	+2.4	+5.5	+7.4	+8.1	+10.9	+13.0
3.0	744	-15.0			-13.2	-11.1	-9.2	-5.9	-4.1	+2.2	+5.6	+7.3	+8.7	+11.9	+13.0	
4.0	744	-13.0			-14.3	-12.5	-10.4	-6.5	-1.0	+1.9	+5.7	+7.2	+8.5	+10.9	+12.0	
5.0	744	-21.0			-15.7	-13.8	-11.6	-8.1	-2.7	+1.4	+5.2	+6.6	+8.1	+10.7	+11.0	
6.0	744	-21.0			-18.7	-16.4	-13.7	-7.3	-3.4	+1.0	+4.9	+6.7	+8.2	+11.4	+12.0	
7.0	744	-25.0			-22.5	-19.0	-16.4	-11.2	-4.1	+1.2	+5.1	+7.5	+8.7	+10.9	+12.0	
8.0	744	-31.0			-25.3	-22.2	-19.0	-13.7	-5.2	+1.3	+5.1	+8.2	+10.7	+16.9	+24.0	
9.0	744	-35.0			-33.4	-29.8	-26.4	-15.7	-6.2	+1.4	+7.1	+11.2	+12.9	+17.9	+20.0	
10.0	744	-35.0			-34.7	-32.7	-30.6	-25.9	-7.4	+2.0	+9.1	+15.0	+17.5	+24.9	+27.0	
11.0	744	-37.0			-51.7	-38.4	-35.7	-31.1	-23.3	+6.5	+2.2	+10.8	+19.5	+24.9	+30.0	
12.0	744	-37.0			-51.7	-38.2	-32.7	-21.4	-9.3	+2.0	+10.6	+15.3	+17.5	+24.9	+30.0	
13.0	744	-52.0			-42.2	-34.5	-32.6	-21.8	-7.9	+0.2	+7.4	+12.0	+13.6	+17.4	+18.0	
14.0	744	-46.0			-41.2	-35.0	-27.9	-17.4	-7.4	-0.6	+4.0	+6.3	+9.7	+13.9	+14.0	
15.0	744	-30.0			-37.9	-32.2	-23.2	-16.0	-7.8	-0.8	+2.4	+5.0	+6.7	+10.0	+11.0	
16.0	744	-31.0			-24.7	-24.5	-21.5	-17.5	-11.6	-5.7	-0.6	+2.4	+3.8	+5.3	+8.4	
17.0	744	-21.0			-21.7	-15.6	-13.6	-11.5	-7.9	-3.4	0.0	+2.3	+3.8	+5.3	+7.4	
18.0	744	-10.0			-15.7	-10.9	-9.5	-7.7	-5.2	-1.7	0.5	+2.7	+3.7	+4.9	+12.9	
19.0	744	-13.0			-8.5	-7.4	-5.3	-3.5	-0.6	1.7	+3.8	+4.8	+6.2	+7.9	+10.0	
20.0	744	-7.0			-7.3	-5.9	-4.6	-2.2	-0.1	2.6	+4.8	+5.8	+6.7	+8.9	+10.0	
21.0	744	-7.0			-6.1	-4.7	-3.7	-1.9	+0.0	2.4	+4.7	+5.7	+6.7	+8.9	+10.0	
22.0	744	-11.0			-6.7	-5.5	-4.2	-1.3	+0.2	3.0	+5.5	+6.7	+7.8	+9.4	+10.0	
23.0	744	-10.0			-6.7	-5.2	-3.7	-1.5	+0.5	3.4	+5.6	+6.8	+7.5	+9.6	+10.0	
24.0	744	-13.0			-6.9	-5.3	-3.6	-1.5	+0.6	3.6	+5.9	+7.0	+8.5	+10.9	+15.0	
25.0	744	-11.0			-11.9	-7.9	-5.8	-4.7	-2.0	0.3	+3.6	+5.6	+6.7	+7.9	+10.9	
26.0	744	-14.0			-10.7	-6.2	-6.9	-5.8	-2.0	0.0	+3.1	+5.5	+6.8	+7.6	+8.9	
27.0	744	-12.0			-5.8	-8.3	-6.5	-3.7	-0.4	3.0	+4.9	+5.9	+7.1	+10.9	+13.0	
28.0	74	-4.0			-7.5	-5.7	-2.8	0.0	5.3	4.1	11.2	12.2	12.7	12.8		
29.0	82	-8.1			-7.5	-6.7	-4.4	0.5	3.7	6.5	8.1	11.2	12.1	12.2		
30.0	86	-4.5				-7.5	-6.5	-0.4	3.0	6.4	9.6	11.1	11.7	11.7		
31.0	86	-12.4				-11.5	-6.0	-0.4	4.9	7.0	9.6	10.1	10.6	10.7		
32.0	90	-12.6				-12.5	-10.2	-7.2	-1.4	4.3	8.4	11.0	14.1	14.5	14.5	
33.0	90	-16.6				-13.0	-12.4	-9.9	-3.0	4.5	8.6	9.1	10.1	10.1	10.2	
34.0	90	-20.4				-10.0	-15.7	-11.4	-4.5	1.1	5.3	6.4	7.1	7.9	8.1	
35.0	90	-22.9				-22.0	-17.5	-13.0	-6.4	0.3	4.5	5.7	6.1	6.4	6.4	
36.0	91	-22.9				-21.0	-17.4	-13.0	-4.3	-0.5	4.2	5.0	7.0	7.5	7.5	
37.0	90	-25.8				-24.0	-19.8	-16.2	-4.6	-1.1	3.3	5.0	7.1	7.5	7.6	
38.0	89	-24.6				-22.7	-20.6	-16.4	-7.7	1.5	4.5	6.0	7.7	8.1	8.2	
39.0	94	-24.5				-22.0	-21.4	-15.8	-8.2	0.0	5.7	8.0	12.1	13.0	13.2	
40.0	96	-26.4				-23.0	-22.6	-16.6	-8.0	-0.3	6.4	7.0	12.4	13.1	13.2	
41.0	94	-30.7				-22.0	-27.3	-17.0	-0.2	1.4	7.7	10.0	13.4	14.4	14.5	
42.0	97	-34.7				-30.0	-24.1	-17.0	-10.4	0.5	7.2	9.0	13.0	13.7	13.4	
43.0	97	-31.8				-31.4	-29.1	-18.2	-11.1	1.4	6.6	9.0	13.0	13.7	13.4	
44.0	94	-31.6				-29.0	-27.3	-10.5	-10.0	-0.5	7.4	11.0	14.1	14.7	14.9	
45.0	92	-31.7				-24.5	-25.7	-19.4	-0.6	-0.3	6.4	9.0	16.1	16.7	16.4	
46.0	95	-31.0				-24.4	-26.7	-20.4	-0.7	0.4	5.4	6.0	17.1	14.3	14.4	
47.0	91	-32.7				-30.0	-27.5	-20.4	-10.4	2.1	6.4	9.0	14.1	14.6	14.5	
48.0	89	-34.7				-31.0	-27.6	-21.8	-11.9	-0.4	7.3	10.0	11.1	11.5	11.5	
49.0	86	-30.2				-35.0	-27.7	-22.3	-12.0	-1.0	3.0	7.0	7.7	8.2	8.2	
50.0	84	-34.0				-34.1	-32.4	-22.4	-12.3	-4.4	0.0	4.1	7.2	8.2	8.3	
51.0	79	-34.4				-30.1	-22.5	-12.1	-2.5	1.1	2.4	3.2	3.9	4.0		
52.0	75	-33.1				-32.4	-29.7	-22.1	-13.4	-4.4	1.1	1.4	2.3	3.2	3.3	
53.0	70	-34.0				-31.4	-24.5	-26.2	-15.3	-3.1	0.4	1.7	2.2	2.6	2.7	
54.0	63	-34.9				-33.4	-31.8	-25.5	-17.2	-4.7	-1.4	-0.0	0.4	1.1	1.2	
55.0	57	-35.9				-35.7	-33.1	-24.0	-17.7	-7.0	-0.3	-0.1	1.6	2.3	2.4	
56.0	44	-34.9				-34.0	-33.3	-27.5	-19.0	-4.6	-2.7	-2.0	-1.3	-0.4	-0.7	
57.0	40	-37.9					-34.0	-31.7	-21.0	-7.3	-3.0	-0.0	-0.5	-0.2	-0.2	
58.0	34	-42.6					-37.3	-33.4	-21.5	-4.7	1.3	3.2	3.5	3.7	3.4	
59.0	27	-41.4					-39.6	-32.7	-18.5	-4.1	7.7	13.0	13.8	14.0	14.0	
60.0	22	-43.0					-40.0	-33.4	-14.0	-4.5	15.0	19.1	19.5	19.6	19.6	
61.0	14	-47.2						-26.5	-6.2	19.4	19.0	19.2	20.0	20.0		
62.0	4	-37.8						-31.0	-5.7	-6.2	-6.1	-6.1	-6.1	-6.0		
63.0	2	-41.1						-41.0	-26.3	-26.0	-26.0	-25.2	-25.0	-25.9		
64.0	1	-22.1												-22.1		
65.0	1	-20.0												-20.0		
66.0	1	-10.8												-10.8		
67.0	1	-6.4												-6.4		
68.0	1	-1.9												-1.9		
69.0	1	-1.7												-1.7		
70.0	1	-4.6												-4.6		

RIGHT AND LEFT CROSS WIND COMPONENTS 60 DEGREE FLIGHT AZIMUTH TABLE 7.11

DATA SOURCE											NOVEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-12.0			-9.4	-7.6	-6.5	-3.7	-3.0	+1.1	+2.7	+3.4	+4.0	+4.0	+7.0	
1.0	720	-22.0			-13.5	-11.1	-9.1	-5.6	-2.5	+3.3	+5.3	+8.9	+10.0	+15.5	+16.0	
2.0	720	-21.0			-15.7	-13.2	-10.2	-7.2	-1.1	+2.6	+5.7	+7.0	+8.3	+10.0	+11.0	
3.0	720	-24.0			-17.6	-14.7	-11.7	-7.6	-2.5	+1.6	+4.4	+6.0	+7.4	+12.0	+13.0	
4.0	720	-27.0			-18.9	-16.4	-13.6	-9.6	-3.7	+0.5	+3.8	+5.5	+6.9	+13.0	+14.0	
5.0	720	-26.6			-21.7	-19.1	-16.5	-11.5	-5.1	-0.1	+3.0	+4.9	+8.2	+14.0	+15.0	
6.0	720	-32.0			-25.3	-21.3	-18.7	-13.4	-6.9	+0.6	+3.3	+6.5	+9.7	+17.0	+18.0	
7.0	720	-37.0			-27.7	-23.0	-21.5	-15.5	-8.0	+1.1	+3.8	+7.1	+9.7	+19.0	+20.0	
8.0	720	-42.0			-35.7	-29.2	-23.7	-17.7	-9.4	+1.0	+2.8	+7.5	+10.0	+25.0	+26.0	
9.0	720	-49.0			-37.3	-30.5	-26.0	-20.5	-10.8	-2.5	+3.5	+6.9	+10.9	+35.0	+36.0	
10.0	720	-55.0			-40.0	-36.3	-30.5	-22.7	-13.5	-3.9	+2.3	+7.6	+15.2	+44.0	+45.0	
11.0	720	-54.0			-43.7	-40.7	-36.0	-25.7	-13.5	-3.9	+2.3	+7.6	+15.2	+44.0	+45.0	
12.0	720	-53.0			-45.3	-43.1	-37.2	-27.5	-15.0	-1.7	+2.0	+7.5	+14.4	+53.0	+54.0	
13.0	720	-57.0			-42.0	-38.3	-35.2	-26.3	-15.6	-6.0	+2.2	+7.4	+12.8	+51.0	+52.0	
14.0	720	-45.0			-38.4	-35.9	-30.4	-24.4	-14.7	-6.4	-0.1	+3.6	+7.8	+37.0	+38.0	
15.0	720	-42.0			-32.5	-29.1	-25.3	-20.4	-12.7	-5.1	+0.4	+1.5	+3.4	+27.0	+28.0	
16.0	720	-31.0			-27.9	-24.6	-21.4	-16.9	-10.5	-3.9	-0.1	+3.1	+5.9	+24.0	+25.0	
17.0	720	-28.0			-23.9	-21.2	-18.4	-13.5	-7.7	-1.8	+0.0	+3.6	+4.8	+33.0	+34.0	
18.0	720	-23.0			-17.7	-15.7	-13.0	-10.4	-5.4	-0.7	+2.1	+3.5	+5.9	+15.0	+16.0	
19.0	720	-16.0			-13.2	-12.0	-10.3	-7.9	-3.4	-0.1	+2.5	+3.6	+4.0	+10.0	+11.0	
20.0	720	-13.0			-10.6	-9.5	-8.0	-5.7	-2.3	+0.3	+3.1	+4.3	+5.4	+16.0	+17.0	
21.0	720	-19.0			-10.2	-8.2	-6.7	-4.1	-1.6	+0.6	+2.8	+3.9	+4.9	+7.6	+8.0	
22.0	720	-16.0			-10.4	-8.4	-7.0	-4.9	-1.3	+1.0	+2.8	+3.9	+4.8	+9.0	+10.0	
23.0	720	-16.0			-10.9	-9.6	-7.3	-5.2	-1.1	+0.9	+3.0	+4.1	+5.0	+7.8	+8.0	
24.0	720	-17.0			-11.7	-10.1	-8.4	-5.3	-2.0	+0.9	+3.0	+4.1	+5.0	+8.0	+9.0	
25.0	720	-22.0			-13.4	-11.5	-9.8	-6.7	-2.8	+0.5	+3.8	+4.9	+7.2	+11.0	+12.0	
26.0	720	-20.0			-13.9	-12.8	-11.1	-7.7	-4.0	-0.0	+3.7	+4.9	+7.7	+13.0	+14.0	
27.0	720	-20.0			-15.3	-14.1	-12.4	-9.3	-4.7	-0.2	+5.1	+7.7	+10.4	+16.0	+17.0	
28.0	80	-16.7			-15.0	-11.6	-9.8	-7.4	-3.0	4.4	13.4	19.1	19.5	19.5	19.5	
29.0	90	-17.6			-17.5	-14.5	-9.0	-6.3	1.4	7.5	11.0	24.1	24.4	24.4	24.4	
30.0	90	-20.3			-19.0	-16.2	-10.4	-6.0	1.9	6.4	10.0	14.6	15.1	15.1	15.2	
31.0	91	-23.5			-20.5	-18.5	-11.6	-6.5	1.4	4.5	8.0	9.1	10.1	10.3	10.3	
32.0	91	-24.8			-21.0	-19.5	-13.7	-7.5	-0.1	2.7	3.0	8.1	10.2	10.3	10.3	
33.0	92	-26.8			-24.0	-23.1	-15.7	-8.5	-2.4	4.2	5.0	10.1	10.0	11.0	11.0	
34.0	92	-26.0			-25.5	-24.2	-18.5	-10.7	-8.1	2.4	5.0	11.1	11.0	11.9	11.9	
35.0	92	-27.4			-26.0	-24.4	-19.1	-12.0	-5.2	4.7	10.0	15.0	15.0	15.6	15.6	
36.0	90	-29.6			-27.0	-25.5	-21.1	-15.1	-5.5	3.4	10.0	16.1	17.0	17.2	17.2	
37.0	91	-31.9			-29.0	-25.7	-21.6	-16.4	-5.1	1.5	4.0	16.1	16.5	16.6	16.6	
38.0	95	-31.7			-29.4	-24.6	-22.0	-16.5	-6.5	5.4	4.0	14.4	15.3	15.4	15.4	
39.0	94	-34.7			-29.0	-27.6	-22.7	-16.7	-6.9	1.4	7.0	15.1	15.1	16.1	16.2	
40.0	93	-41.3			-32.0	-31.1	-23.8	-16.1	-7.4	3.2	5.0	8.0	8.5	9.4	9.4	
41.0	93	-42.5			-35.0	-33.7	-24.4	-16.2	-6.6	-4.4	1.0	8.1	5.4	5.4	5.4	
42.0	93	-39.7			-35.0	-34.3	-23.1	-15.4	-7.0	-2.5	-1.1	-0.4	0.2	0.2	0.2	
43.0	92	-39.2			-33.0	-32.2	-23.4	-15.0	-7.4	-2.4	-1.4	-1.4	0.1	0.4	0.4	
44.0	94	-34.8			-35.0	-31.4	-24.0	-15.0	-5.4	-1.2	2.6	3.0	3.4	3.4	3.4	
45.0	87	-54.5			-35.0	-31.4	-24.1	-15.0	-6.4	0.7	5.0	6.2	7.1	7.1	7.1	
46.0	84	-35.0			-32.5	-30.0	-26.4	-16.4	-4.4	3.7	7.0	8.1	8.4	8.4	8.4	
47.0	83	-43.1			-36.1	-33.0	-28.0	-16.4	-6.6	1.0	9.1	15.1	15.6	15.7	15.7	
48.0	82	-49.7			-38.1	-35.9	-28.0	-17.5	-6.6	-1.5	5.4	19.2	15.2	15.4	15.4	
49.0	85	-40.4			-44.1	-36.7	-30.4	-16.9	-8.2	-0.4	13.1	17.1	17.5	17.6	17.6	
50.0	84	-47.7			-47.5	-44.8	-33.4	-19.0	-9.1	-1.2	3.1	12.1	12.4	12.9	12.9	
51.0	77	-50.2			-49.2	-47.1	-32.8	-22.3	-13.1	-2.4	6.2	4.2	4.6	4.7	4.7	
52.0	74	-52.4			-49.7	-45.3	-33.4	-23.2	-11.7	-1.7	6.2	6.4	7.4	7.4	7.4	
53.0	70	-54.4			-52.4	-49.5	-34.0	-24.5	-10.1	0.5	5.0	6.4	7.2	7.3	7.3	
54.0	61	-56.4			-52.4	-44.0	-35.4	-23.7	-10.4	-4.0	-0.8	4.4	4.7	4.7	4.7	
55.0	59	-50.8			-44.8	-39.7	-36.7	-24.2	-12.3	-3.6	-1.2	1.7	2.3	2.4	2.4	
56.0	47	-48.5			-47.0	-44.6	-39.6	-25.4	-12.7	-4.1	-7.1	-6.7	-6.4	-6.4	-6.4	
57.0	45	-56.0			-50.0	-47.7	-36.0	-27.5	-15.1	-4.2	-7.0	4.6	9.0	9.0	9.0	
58.0	34	-54.7			-47.1	-35.0	-27.0	-16.0	-5.2	8.2	11.1	11.6	11.9	12.0	12.0	
59.0	29	-48.9			-46.4	-40.4	-25.2	-13.4	-1.4	4.2	8.2	8.4	8.4	8.4	8.4	
60.0	21	-55.7			-52.4	-42.7	-28.4	-14.4	0.0	0.0	0.0	0.0	1.1	1.1	1.1	
61.0	16	-51.2				-44.5	-30.0	-15.6	11.2	11.7	12.0	12.0	12.1	12.1	12.1	
62.0	15	-51.3				-40.6	-25.5	-12.4	1.2	1.4	1.7	1.7	1.8	1.8	1.8	
63.0	11	-54.9				-54.4	-33.4	-12.7	-9.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	
64.0	7	-45.8				-54.0	-42.5	-13.1	-10.0	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	
65.0	4	-40.0					-12.0	-9.2	-2.1	-1.0	-1.0	-1.0	-1.7	-1.7	-1.7	
66.0	4	-42.2					-27.0	-21.2	-15.4	-15.1	-14.0	-14.0	-14.0	-14.0	-14.0	
67.0	4	-40.4					-24.0	-15.6	-15.1	-15.0	-14.0	-14.0	-14.0	-14.0	-14.0	
68.0	4	-32.7					-30.0	-16.4	-16.4	-16.4	-16.4	-16.4	-16.4	-16.4	-16.4	
69.0	3	-25.1					-16.4	-2.5	-2.1	-2.1	-2.1	-2.0	-2.0	-2.0	-2.0	
70.0	2	-10.0					-10.0	3.0	4.1	4.2	4.2	4.3	4.3	4.3	4.3	
Positive is wind from the right (150°). Negative is wind from the left (330°).																

Positive is wind from the right (150°).
Negative is wind from the left (330°).

DATA SOURCE										DECEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA									
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)															
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)
57C	744	-7.0													
1.3	744	-23.0													
2.0	744	-19.0													
3.0	744	-27.0													
4.0	744	-32.0													
5.0	744	-37.0													
6.0	744	-38.0													
7.0	744	-40.0													
8.0	744	-43.0													
9.0	744	-44.0													
10.0	744	-55.0													
11.0	744	-55.0													
12.0	744	-63.0													
13.0	744	-70.0													
14.0	744	-55.0													
15.0	744	-55.0													
16.0	744	-33.0													
17.0	744	-32.0													
18.0	744	-26.0													
19.0	744	-19.0													
20.0	744	-21.0													
21.0	744	-23.0													
22.0	744	-21.0													
23.0	744	-21.0													
24.0	744	-21.0													
25.0	744	-27.0													
26.0	744	-23.0													
27.0	744	-28.0													
28.0	132	-29.5													
29.0	134	-29.2													
30.0	134	-26.4													
31.0	140	-26.4													
32.0	141	-31.4													
33.0	141	-31.0													
34.0	141	-26.0													
35.0	141	-27.6													
36.0	141	-32.0													
37.0	141	-39.9													
38.0	141	-50.7													
39.0	142	-50.4													
40.0	142	-56.1													
41.0	142	-61.6													
42.0	140	-52.3													
43.0	139	-42.9													
44.0	140	-50.8													
45.0	138	-58.0													
46.0	137	-59.2													
47.0	134	-57.6													
48.0	136	-55.8													
49.0	130	-55.4													
50.0	127	-60.3													
51.0	122	-71.2													
52.0	115	-76.0													
53.0	110	-75.7													
54.0	102	-67.7													
55.0	92	-65.0													
56.0	81	-67.6													
57.0	67	-69.8													
58.0	51	-61.7													
59.0	34	-61.3													
60.0	22	-47.6													
61.0	15	-57.2													
62.0	8	-52.5													
63.0	2	-57.1													
64.0	1	-49.1													

Positive is wind from the right (150°).
Negative is wind from the left (330°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.1

DATA SOURCE										JANUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)
5FC	744	-9.0			-6.4	-5.0	-3.9	-2.1	-0.2	+2.1	+4.0	+5.3	+6.5	+7.9	+10.0	
1+0	744	-12.0			-10.9	-9.7	-8.1	-6.1	+1.8	+8.9	+14.5	+16.6	+18.5	+21.9	+23.0	
2+0	744	-10.0			-7.6	-5.5	-3.3	-0.2	+5.5	+13.7	+18.6	+22.5	+25.7	+29.9	+32.0	
3+0	744	-6.0			-5.9	-3.3	-2.1	-0.4	+2.9	+8.7	+17.3	+24.4	+27.1	+29.5	+34.9	
4+0	744	-5.0			-4.9	-1.7	-0.7	+1.1	+5.7	+12.5	+22.1	+27.6	+31.3	+34.7	+40.9	
5+0	744	-3+0			-2.9	-1.1	+0.4	+2.9	+8.0	+16.1	+24.5	+33.4	+38.5	+41.7	+46.9	
6+0	744	-3+0			-1.9	-0.1	+3.3	+5.7	+10.7	+20.3	+31.1	+38.3	+43.2	+47.8	+51.4	
7+0	744	-8+0			-4.9	+1.6	+3.4	+7.5	+13+0	+24+0	+36+9	+44+6	+49.5	+53+5	+58+9	
8+0	744	-7+0			-5.9	+1.2	+4.6	+8.1	+15+6	+27+7	+41+0	+49+4	+56+0	+59+5	+66+9	
9+0	744	-5+0			-4.9	+0.7	+4.6	+8.8	+17+8	+30+7	+45+7	+56+4	+62+0	+66+2	+69+9	
10+0	744	-8+0			-4.9	-0+1	+4+7	+9+3	+20+0	+35+0	+50+8	+62+1	+68+3	+73+2	+79+4	
11+0	744	-5+0			-1.9	+2+2	+4+7	+12+1	+21+4	+38+1	+55+1	+72+2	+76+7	+82+9	+87+0	
12+0	744	-4+0			-0+9	+4+8	+7+9	+13+7	+25+2	+41+1	+56+6	+73+0	+77+5	+83+9	+87+0	
13+0	744	-2+0			+2+0	+8+4	+12+9	+18+3	+27+6	+40+6	+55+5	+69+9	+72+2	+75+5	+80+9	
14+0	744	+6+0			+8+0	+12+0	+14+9	+19+3	+27+1	+38+0	+52+3	+62+9	+69+0	+70+9	+80+9	
15+0	744	+6+0			+8+0	+11+7	+15+3	+17+6	+24+0	+33+9	+45+7	+54+9	+61+0	+68+5	+77+9	
16+0	744	+6+0			+7+0	+10+1	+12+2	+14+6	+20+7	+29+3	+39+5	+46+3	+51+5	+55+1	+61+9	
17+0	744	+2+0			+3+0	+6+4	+8+3	+10+6	+15+2	+23+1	+32+8	+38+8	+43+3	+47+2	+54+9	
18+0	744	-2+0			-1.9	-0+3	+3+2	+6+1	+9+9	+16+7	+24+7	+32+2	+37+3	+40+6	+43+9	
19+0	744	-6+0			-5.9	-2+3	-0+7	+1+2	+4+9	+11+0	+18+0	+26+1	+31+6	+35+2	+48+9	
20+0	744	-8+0			-7.9	-4+8	-3+5	+1+7	+1+0	+6+8	+13+3	+20+1	+23+8	+26+8	+39+9	
21+0	744	-15+0			-11+9	-9+1	-6+4	-3+9	-0+5	+4+3	+11+0	+18+1	+21+7	+23+9	+31+9	
22+0	744	-27+0			-19+9	-11+7	-9+0	-6+0	-1+7	+3+3	+10+1	+16+5	+21+0	+27+7	+34+9	
23+0	744	-19+0			-16+9	-12+9	-10+7	-7+8	-2+7	+2+9	+9+8	+16+6	+23+0	+27+5	+36+9	
24+0	744	-24+0			-23+9	-16+5	-12+6	-9+9	-3+8	+3+6	+10+7	+17+8	+23+5	+27+7	+36+9	
25+0	744	-23+0			-14+9	-15+5	-12+1	-9+6	-3+6	+4+2	+13+3	+20+2	+24+1	+28+8	+37+9	
26+0	744	-26+0			-23+9	-17+8	-14+7	-10+4	-3+9	+5+5	+16+9	+24+3	+30+2	+34+2	+48+9	
27+0	744	-31+0			-27+9	-20+8	-18+0	-12+7	-4+4	+6+0	+19+3	+28+0	+34+0	+44+9	+52+0	
28+0	104	-19+6			-19+6	-17+6	-14+7	-8+4	0+8	18+8	26+4	29+4	30+4	36+2	36+4	
29+0	107	-25+8			-22+0	-20+6	-16+7	-6+0	0+0	24+0	29+2	30+4	31+0	34+2	34+4	
30+0	104	-32+9			-24+0	-23+4	-19+6	-5+2	15+6	28+6	31+2	36+6	37+2	41+4	41+6	
31+0	104	-32+3			-30+0	-25+4	-22+6	-6+2	15+4	30+6	39+4	40+6	41+2	44+2	44+4	
32+0	114	-40+0			-35+0	-32+4	-25+3	-7+3	17+1	32+5	40+4	49+7	43+0	45+7	45+0	
33+0	114	-47+8			-43+8	-34+4	-32+1	-8+8	10+5	35+0	39+4	42+7	44+0	46+7	46+4	
34+0	117	-51+1			-50+8	-46+3	-33+6	-7+7	21+5	36+6	41+2	44+4	49+8	51+2	51+4	
35+0	114	-61+7			-53+8	-52+7	-42+2	-5+8	24+0	35+6	42+4	44+4	51+4	52+5	52+5	
36+0	114	-64+8			-54+4	-50+2	-45+2	-5+4	24+4	35+0	42+6	51+0	52+4	52+0	53+0	
37+0	114	-73+4			-59+8	-58+2	-56+1	-5+0	24+3	35+4	43+4	51+2	51+0	55+7	55+8	
38+0	114	-76+3			-64+8	-63+4	-53+2	-5+0	26+1	37+4	44+1	50+4	51+5	52+1	52+2	
39+0	117	-67+8			-67+6	-64+4	-54+1	-6+4	27+4	38+4	45+2	48+4	51+4	51+8	51+9	
40+0	114	-77+0			-65+8	-64+4	-52+6	-6+8	27+8	39+4	47+5	50+4	51+4	52+2	52+3	
41+0	117	-78+1			-68+8	-61+7	-46+1	-7+1	25+8	40+5	48+7	50+4	53+4	53+7	55+4	
42+0	114	-74+5			-63+0	-53+7	-37+3	-6+0	24+5	40+6	50+7	56+8	58+4	59+2	59+3	
43+0	114	-84+1			-62+0	-52+4	-35+3	-7+1	23+5	40+0	53+4	62+7	63+0	66+6	66+6	
44+0	114	-87+2			-60+0	-53+4	-33+2	-5+5	25+1	41+6	54+7	65+4	67+0	71+7	71+4	
45+0	114	-85+7			-58+0	-55+6	-31+4	-2+7	24+6	41+8	57+5	64+6	69+0	70+4	70+7	
46+0	114	-85+0			-54+0	-54+6	-22+5	-2+5	26+0	43+4	59+5	65+7	68+4	72+6	72+6	
47+0	104	-82+4			-54+0	-52+6	-25+3	-3+6	27+0	45+2	61+7	68+4	69+0	71+1	71+3	
48+0	104	-78+0			-51+0	-45+6	-22+8	-1+8	29+4	47+7	60+0	68+4	67+0	71+7	71+8	
49+0	104	-55+9			-56+0	-42+7	-22+0	1+3	31+0	49+5	61+0	66+7	69+0	71+4	71+5	
50+0	104	-60+1			-60+0	-34+7	-21+0	0+0	32+7	51+5	61+0	67+7	71+4	71+6	71+7	
51+0	94	-57+5			-28+0	-21+2	0+1	34+5	55+2	67+1	68+0	73+0	73+6	73+6	73+6	
52+0	84	-50+6			-25+0	-23+6	-0+5	35+5	55+5	67+6	71+0	75+1	75+5	75+5	75+5	
53+0	84	-43+7			-41+1	-18+4	1+7	38+3	58+2	68+0	74+1	75+2	75+0	76+1	76+1	
54+0	72	-33+8			-16+7	-11+4	6+4	43+3	63+6	73+4	76+0	78+2	79+6	79+6	79+6	
55+0	64	-26+4			-12+6	-8+4	7+2	37+0	64+0	76+8	80+6	83+4	84+7	84+7	84+7	
56+0	57	-4+2			-8+7	-7+1	12+0	39+8	71+0	81+2	88+0	88+7	89+0	89+0	89+0	
57+0	46	-4+1			-3+7	-3+7	13+4	43+0	77+2	92+7	97+0	108+4	109+3	109+4	109+4	
58+0	26	-2+8					-0+7	11+1	47+0	76+9	97+7	139+6	140+0	140+3	140+3	
59+0	14	4+3						11+0	43+0	79+1	115+1	115+7	116+0	116+2	116+2	
60+0	10	10+5						12+6	34+0	70+4	71+4	71+6	71+6	71+7	71+7	
61+0	7	13+4						14+1	43+5	57+9	70+7	70+0	71+0	71+0	71+0	
62+0	6	23+2							50+0	67+1	67+4	67+0	68+0	68+1	68+1	
63+0	5	23+8							50+5	82+3	83+0	83+2	83+3	83+3	83+3	
64+0	4	23+6							52+0	66+4	66+8	66+0	67+0	67+0	67+0	
65+0	3	28+8							53+8	61+3	61+5	61+6	61+6	61+6	61+6	
66+0	3	18+0							52+5	60+4	61+2	61+0	61+4	61+5	61+5	
67+0	3	34+1							45+5	60+5	60+4	60+0	60+0	60+0	60+0	
68+0	4	30+1							48+0	111+3	111+6	111+7	111+8	111+8	111+8	
69+0	4	23+5							46+0	120+3	120+6	120+7	120+8	120+8	120+8	
70+0	4	21+3							30+0	125+3	125+6	125+6	125+7	125+7	125+7	

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.2

DATA SOURCE							FEBRUARY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	678	-9.0			-7.3	-6.1	-4.5	-2.4	-0.3	+2.4	+4.8	+6.6	+7.8	+10.0	+11.0	
1.0	678	-17.0			-11.4	-9.5	-7.1	-2.5	-2.7	+9.7	+16.0	+17.9	+22.1	+24.0	+25.0	
2.0	678	-12.0			-8.8	-6.1	-3.0	-0.0	+6.4	+15.3	+21.2	+24.5	+27.6	+30.5	+31.0	
3.0	678	-6.0			-4.3	-2.9	-0.8	+2.9	+10.1	+17.7	+26.0	+29.6	+33.4	+35.6	+36.0	
4.0	678	-5.0			-2.6	-0.9	+0.7	+4.9	+12.8	+24.1	+30.8	+35.1	+38.7	+40.0	+40.0	
5.0	678	-5.0			-1.0	-0.2	+1.7	+7.2	+16.5	+28.2	+34.0	+39.8	+45.1	+46.0	+46.0	
6.0	678	-3.0			-0.8	+0.3	+3.3	+9.4	+21.0	+33.5	+41.5	+49.1	+54.1	+54.0	+54.0	
7.0	678	-7.0			-0.4	+2.8	+4.8	+11.5	+24.2	+38.4	+48.6	+53.0	+58.2	+58.0	+58.0	
8.0	678	-10.0			-0.5	+3.3	+5.7	+13.5	+27.6	+43.5	+54.7	+60.6	+66.6	+67.0	+67.0	
9.0	678	-15.0			-2.6	+1.8	+6.5	+14.5	+31.8	+48.1	+61.5	+68.2	+74.1	+74.0	+74.0	
10.0	678	-14.0			-5.1	+1.7	+7.2	+16.0	+36.8	+53.8	+67.0	+71.9	+75.2	+75.0	+75.0	
11.0	678	-17.0			-4.2	+3.8	+9.1	+18.8	+39.5	+58.0	+71.6	+78.2	+82.8	+83.0	+83.0	
12.0	678	-6.0			+1.8	+6.4	+12.7	+21.9	+41.9	+59.7	+74.0	+83.7	+88.5	+89.0	+89.0	
13.0	678	-3.0			+8.2	+11.1	+16.4	+23.8	+40.9	+58.8	+72.4	+80.5	+84.8	+85.0	+85.0	
14.0	678	-5.0			+8.8	+12.7	+16.9	+23.8	+38.4	+54.2	+62.8	+70.2	+77.6	+78.0	+78.0	
15.0	678	-2.0			+8.8	+11.6	+15.0	+21.2	+33.5	+46.6	+56.1	+60.7	+65.1	+65.0	+65.0	
16.0	678	-2.0			+6.9	+9.7	+12.1	+18.2	+28.4	+41.1	+48.0	+51.9	+55.8	+56.0	+56.0	
17.0	678	-11.0			+2.3	+5.6	+8.4	+14.0	+22.9	+32.8	+41.0	+44.1	+46.6	+46.0	+46.0	
18.0	678	-8.0			-0.7	+1.3	+4.1	+8.9	+16.1	+25.7	+32.6	+37.5	+40.8	+40.0	+40.0	
19.0	678	-9.0			-1.6	-0.7	+0.2	+3.3	+10.0	+18.7	+27.2	+30.6	+32.7	+32.0	+32.0	
20.0	678	-12.0			-9.1	-6.5	-4.0	-0.5	+5.2	+13.1	+19.5	+23.5	+26.6	+26.0	+26.0	
21.0	678	-15.0			-11.4	-9.3	-6.4	-2.5	+2.3	+9.0	+14.9	+17.3	+23.4	+23.0	+23.0	
22.0	678	-25.0			-14.2	-11.5	-9.1	-3.5	+0.9	+7.4	+12.0	+15.1	+20.2	+20.0	+20.0	
23.0	678	-30.0			-15.6	-12.5	-10.0	-4.1	+0.5	+6.6	+11.9	+15.3	+17.8	+17.0	+17.0	
24.0	678	-22.0			-18.7	-13.9	-10.5	-4.5	+1.0	+7.3	+11.7	+14.3	+16.0	+16.0	+16.0	
25.0	678	-26.0			-19.7	-15.3	-12.2	-5.6	+1.0	+8.1	+12.6	+14.9	+17.7	+17.0	+17.0	
26.0	678	-35.0			-19.5	-16.4	-12.7	-5.4	+2.0	+8.8	+13.8	+16.9	+18.9	+18.0	+18.0	
27.0	678	-45.0			-21.6	-16.8	-12.7	-5.4	+2.5	+10.2	+14.0	+18.9	+23.6	+23.0	+23.0	
28.0	89	-11.8				-11.6	-10.4	-2.0	+6.1	+14.0	+20.0	+25.1	+25.7	+25.1	+25.1	
29.0	82	-13.4				-11.6	-10.4	0.3	+7.3	+16.0	+22.0	+25.1	+27.3	+27.3	+27.3	
30.0	81	-11.9				-12.4	-10.0	0.4	+12.1	+21.0	+26.0	+29.6	+30.2	+30.2	+30.2	
31.0	81	-11.9				-11.6	-8.9	3.4	+16.5	+25.0	+30.0	+33.2	+34.1	+34.5	+34.5	
32.0	81	-15.7				-15.2	-7.5	3.0	+20.1	+29.6	+34.0	+38.2	+47.1	+47.5	+47.5	
33.0	84	-14.5				-13.0	-10.3	3.0	+21.0	+32.0	+35.6	+37.6	+49.1	+49.0	+49.0	
34.0	94	-14.1				-12.0	-8.1	2.6	+20.4	+32.1	+37.3	+34.0	+45.1	+46.1	+46.2	
35.0	100	-11.5				-10.0	-7.5	1.0	+19.7	+31.6	+34.7	+42.7	+43.7	+44.3	+44.4	
36.0	100	-19.7				-10.7	-7.0	4.2	+19.0	+31.0	+43.5	+44.0	+47.7	+47.3	+47.3	
37.0	106	-21.1				-14.0	-13.6	9.2	+4.3	+20.6	+32.3	+43.2	+43.0	+49.0	+56.1	
38.0	107	-23.9				-23.8	-10.4	5.0	+22.3	+34.0	+42.6	+50.4	+51.2	+54.7	+54.9	
39.0	104	-24.0				-14.0	-17.5	15.3	5.0	+23.4	+35.2	+42.6	+49.6	+50.0	+61.4	
40.0	104	-37.0				-23.0	-14.5	-13.4	7.4	+24.5	+34.6	+43.4	+46.0	+63.0	+65.6	
41.0	112	-42.4				-27.0	-18.5	-13.2	4.4	+25.3	+37.3	+47.0	+51.6	+72.2	+72.4	
42.0	104	-42.6				-21.0	-20.3	-5.9	+10.8	+27.3	+34.2	+50.6	+63.6	+70.2	+73.4	
43.0	104	-34.6				-22.9	-15.5	-5.6	+11.1	+25.7	+41.0	+53.3	+66.6	+71.2	+73.6	
44.0	104	-34.6				-22.0	-14.6	-5.7	+10.8	+24.7	+44.2	+59.7	+69.6	+70.2	+73.6	
45.0	106	-45.0				-20.0	-9.4	-3.4	+14.0	+30.5	+47.6	+62.4	+69.6	+70.0	+73.4	
46.0	102	-41.1				-20.0	-5.7	+1.1	+16.1	+31.8	+50.3	+66.0	+70.7	+73.0	+75.1	
47.0	102	-32.3				-15.0	-2.7	+0.7	+15.4	+34.5	+53.2	+66.0	+71.2	+71.0	+72.3	
48.0	94	-30.4				-0.4	-0.4	+3.0	+19.2	+35.4	+54.5	+69.1	+71.0	+75.7	+76.3	
49.0	94	-24.5				3.1	6.4	+21.1	+36.0	+54.0	+70.1	+72.8	+80.0	+80.5	+80.5	
50.0	90	-26.3				4.0	8.5	+22.4	+36.3	+54.0	+69.5	+71.0	+82.1	+82.0	+83.0	
51.0	83	-25.2				-8.1	9.2	+25.2	+37.3	+53.7	+70.2	+73.1	+80.1	+80.8	+80.8	
52.0	80	-25.0				-9.2	7.0	+27.2	+40.5	+57.3	+73.0	+77.0	+78.4	+79.2	+79.3	
53.0	74	-24.3				-6.8	+11.7	+29.7	+43.0	+61.4	+73.3	+77.0	+78.4	+79.3	+79.3	
54.0	66	-19.8				-9.4	+15.3	+31.2	+47.0	+65.3	+75.7	+79.0	+83.3	+83.8	+83.8	
55.0	60	-12.8				+11.4	+20.0	+30.5	+50.6	+70.5	+80.0	+85.6	+90.0	+90.6	+90.6	
56.0	50	-5.8				+19.1	+23.3	+28.0	+51.0	+64.1	+89.5	+90.0	+102.6	+102.0	+103.0	
57.0	46	-4.6				+14.0	+25.3	+31.1	+54.5	+69.0	+84.4	+105.0	+120.3	+120.6	+120.6	
58.0	32	-4.8					+16.0	+33.7	+53.2	+69.4	+78.1	+105.1	+105.7	+106.1	+106.1	
59.0	27	16.6					+24.2	+33.3	+54.5	+81.7	+95.7	+104.6	+104.0	+105.2	+105.2	
60.0	20	10.8					+11.0	+40.1	+53.0	+87.8	+97.0	+100.1	+100.1	+100.3	+100.3	
61.0	13	4.6						+35.1	+64.5	+93.0	+100.3	+100.3	+100.3	+100.3	+100.3	
62.0	7	-4.7						+29.1	+92.3	+94.6	+95.0	+95.1	+95.2	+95.2	+95.2	
63.0	4	32.0							+88.0	+111.8	+111.8	+111.8	+112.0	+112.0	+112.0	
64.0	2	84.7														
65.0	1	74.4														
66.0	-2	57.0														
67.0	1	114.7														
68.0	3	106.0														
69.0	3	52.1														
70.0	3	43.3														

Positive is wind from the tail (25°).

Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.3

DATA SOURCE							MARCH									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	+10.0			-7.8	-5.5	-4.4	-2.6	-0.5	+1.8	+4.4	+6.3	+7.1	+9.4	+10.0	
1.0	744	+14.0		-17.9	-12.2	-9.0	-7.2	-3.1	+2.3	+9.0	+14.7	+16.6	+18.7	+22.4	+23.0	
2.0	744	+13.0		-12.9	-9.2	-6.0	-3.2	-0.2	+5.8	+8.0	+14.3	+21.3	+24.5	+29.9	+34.0	
3.0	744	+18.0		-16.9	-5.6	-2.7	-0.8	+2.1	+8.7	+17.0	+23.1	+26.6	+30.1	+41.9	+49.0	
4.0	744	+19.0		-14.9	-2.8	-0.8	-0.1	+3.9	+12.0	+21.6	+27.2	+32.6	+37.2	+47.9	+50.0	
5.0	744	+17.0			-2.5	+0.2	+2.3	+6.6	+15.6	+26.7	+32.6	+38.0	+43.5	+46.9	+63.0	
6.0	744	+20.0			-1.5	+1.4	+4.5	+9.7	+20.1	+30.4	+37.7	+42.2	+46.7	+51.9	+64.0	
7.0	744	+23.0		-19.9	-1.5	+0.9	+6.5	+12.7	+23.5	+35.2	+43.7	+48.6	+53.7	+63.4	+64.0	
8.0	744	+20.0			-2.5	+1.9	+8.2	+16.0	+26.9	+39.3	+47.9	+55.2	+60.5	+74.9	+80.0	
9.0	744	+19.0		-17.9	-0.8	+4.9	+9.7	+17.6	+30.7	+43.7	+55.8	+61.6	+70.5	+83.9	+87.0	
10.0	744	+22.0		-18.9	-4.5	+5.3	+10.4	+20.3	+34.6	+48.7	+60.8	+70.0	+78.2	+88.9	+90.0	
11.0	744	+25.0		-20.9	-0.7	+7.9	+12.5	+23.5	+37.5	+53.9	+64.3	+74.0	+81.5	+92.9	+94.0	
12.0	744	+17.0		-12.9	+2.4	+10.9	+16.8	+26.2	+40.1	+55.8	+68.6	+75.2	+84.2	+101.9	+104.0	
13.0	744	+7.0		-6.9	+7.4	+14.2	+19.1	+27.7	+41.0	+54.6	+64.2	+72.0	+81.2	+87.9	+93.0	
14.0	744	+2.0		-0.9	+5.4	+14.9	+19.4	+27.4	+37.5	+50.2	+59.1	+64.6	+72.2	+78.9	+83.0	
15.0	744	+0.0			+6.4	+13.7	+16.5	+23.3	+33.2	+42.9	+53.2	+59.0	+65.7	+70.6	+71.0	
16.0	744	+4.0		+0.0	+5.1	+9.2	+13.5	+19.0	+28.6	+36.7	+43.0	+47.6	+52.5	+64.9	+68.0	
17.0	744	+5.0		-2.9	+2.4	+7.2	+9.3	+13.9	+22.6	+30.9	+37.1	+41.0	+43.7	+52.9	+55.0	
18.0	744	+2.0			+0.2	+2.3	+4.8	+8.4	+15.6	+23.9	+31.1	+34.1	+35.6	+40.9	+44.0	
19.0	744	+10.0		-6.9	-4.7	-1.6	-0.0	+3.0	+8.5	+16.6	+23.3	+27.1	+30.3	+33.9	+38.0	
20.0	744	+18.0		-13.9	-8.5	-6.0	-3.3	-0.4	+4.3	+11.2	+16.8	+20.7	+25.8	+30.9	+34.0	
21.0	744	+17.0		-15.9	-12.7	-10.0	-7.0	-2.4	+1.1	+7.5	+12.0	+15.2	+17.5	+22.9	+24.0	
22.0	744	+32.0		-31.9	-12.7	-9.8	-7.6	-3.9	+0.1	+5.5	+9.9	+13.5	+18.2	+28.9	+44.0	
23.0	744	+35.0		-31.9	-18.1	-13.0	-9.1	-5.0	-0.5	+3.9	+8.1	+10.8	+16.1	+23.9	+35.0	
24.0	744	+38.0		-28.9	-20.1	-15.4	-10.8	-5.7	-0.6	+4.7	+8.5	+11.1	+13.1	+14.9	+17.0	
25.0	744	+34.0		-32.9	-24.2	-17.0	-10.9	-5.8	-0.4	+4.9	+10.7	+13.5	+18.3	+21.9	+25.0	
26.0	744	+35.0		-33.9	-24.5	-18.0	-11.2	-5.5	-0.0	+6.6	+12.2	+16.5	+20.3	+22.9	+31.0	
27.0	744	+48.0		-40.9	-29.2	-19.5	-12.8	-5.8	-0.3	+7.7	+12.9	+19.0	+21.7	+32.9	+34.0	
28.0	89	+13.3				-0.5	-5.5	-2.3	+0.1	14.0	16.1	19.0	24.9	28.2	25.4	
29.0	93	+14.2				-5.0	-4.8	-0.4	6.4	15.2	18.7	20.6	26.1	27.0	27.2	
30.0	97	+16.0				-7.8	-6.4	-0.3	9.1	18.4	21.5	22.0	30.0	31.1	31.2	
31.0	94	+17.5				-6.4	-4.1	2.4	10.0	22.4	24.4	26.0	30.0	29.8	29.4	
32.0	101	+14.8				-8.0	-6.0	2.6	10.5	24.0	29.0	32.0	33.0	34.7	34.4	
33.0	103	+20.9				-16.0	-7.0	3.3	9.7	27.3	31.0	34.7	36.0	37.1	37.2	
34.0	103	+20.5				-16.0	-10.7	1.8	10.9	27.9	34.4	35.0	38.0	40.0	41.1	
35.0	109	+17.3				-16.0	-12.5	-2.0	2.1	11.7	25.4	33.5	35.6	36.0	39.1	
36.0	109	+17.3				-15.5	-6.3	1.0	11.8	22.8	32.5	34.4	35.0	36.0	36.2	
37.0	113	+14.0				-13.4	-3.4	3.3	11.2	24.0	30.4	33.9	37.0	37.0	37.2	
38.0	113	+14.4				-13.0	-7.3	3.7	13.1	24.1	30.2	33.8	36.0	39.1	39.3	
39.0	114	+26.2				-14.0	-8.7	4.5	18.0	24.7	31.3	34.0	40.0	43.0	44.1	
40.0	116	+32.3				-11.8	-8.4	5.1	16.0	24.7	34.2	39.0	40.8	43.4	44.0	
41.0	116	+34.8				-10.0	-9.4	5.1	17.3	26.3	37.2	40.0	42.8	44.5	44.6	
42.0	116	+35.5				-13.8	-11.4	7.1	14.5	27.7	37.2	39.7	44.8	47.8	47.9	
43.0	116	+31.6				-9.0	-8.4	8.1	19.0	28.3	40.2	44.0	45.0	48.8	49.0	
44.0	113	+24.2				-8.0	-7.7	-2.4	10.6	20.4	30.4	40.4	45.7	46.0	55.6	
45.0	111	+22.9				-7.0	-6.7	-4.2	11.3	21.3	31.2	45.2	46.7	51.0	54.4	
46.0	110	+17.1				-0.0	-6.5	12.6	22.8	30.4	36.2	40.6	52.9	53.7	53.8	
47.0	104	+11.0				-7.0	-6.5	-2.2	13.0	29.5	37.4	45.3	48.0	49.0	52.2	
48.0	107	+4.0				-7.0	-5.8	0.3	15.7	25.4	37.5	48.3	50.8	60.1	60.3	
49.0	105	+10.1				-7.0	-4.8	5.1	17.8	28.9	40.4	44.0	54.4	58.0	64.3	
50.0	102	+10.6				-10.0	-3.8	6.1	19.4	31.3	41.5	49.3	53.9	61.0	67.1	
51.0	97	+0.1				-0.0	7.0	2.0	21.6	31.8	43.2	52.2	62.0	66.0	66.9	
52.0	94	+7.7				1.1	11.7	23.2	34.5	44.5	53.7	63.0	64.8	64.0	65.0	
53.0	87	+15.4				-3.0	15.4	22.7	30.2	44.2	58.7	64.0	64.8	64.8	64.3	
54.0	80	+16.6				-6.2	9.0	24.9	35.8	46.2	57.6	64.0	65.9	68.1	68.3	
55.0	69	+14.7				-10.4	8.5	22.3	35.9	47.4	57.5	61.8	62.3	62.0	63.0	
56.0	50	+13.9				7.4	9.0	28.4	39.2	48.7	56.5	57.4	70.3	70.7	70.7	
57.0	51	+13.0				11.2	12.3	26.1	40.8	52.3	58.5	65.8	68.4	68.9	69.0	
58.0	41	+10.7					18.1	25.3	42.8	53.5	61.0	70.1	70.4	71.0	71.1	
59.0	32	+3.1					14.6	31.1	42.0	56.5	66.4	81.3	81.4	82.1	82.1	
60.0	22	+12.8					17.1	31.5	44.0	54.5	69.0	81.0	81.7	81.8	81.8	
61.0	14	+15.2						23.2	47.5	55.4	69.2	69.6	69.7	69.7	69.8	
62.0	10	+10.8						19.6	44.5	60.3	61.0	61.2	61.3	61.3	61.3	
63.0	7	+11.6						15.1	45.3	68.0	71.0	72.2	72.2	72.4	72.4	
64.0	5	+20.3						40.5	40.5	81.1	81.5	81.6	81.6	81.6	81.6	
65.0	3	+10.5						38.5	50.3	50.3	50.4	50.4	50.4	50.4	50.6	
66.0	2	+4.6						5.0	25.3	25.3	25.4	25.4	25.4	25.4	25.5	
67.0	1	+3.2													3.2	
68.0	1	+1.2													-1.2	
69.0	1	+1.4													-3.4	
70.0	1	+2.6													-2.5	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.4

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED
5FC	720	-9.0			-7.3	-6.2	-5.2	-3.9	-1.4	+1.4	+3.6	+4.9	+5.9	+10.0	+11.0	
1.0	720	-11.0			-10.9	-9.8	-8.4	-5.4	-0.1	+6.3	+12.2	+16.3	+18.7	+21.6	+22.0	
2.0	720	-17.0			-11.6	-9.6	-7.2	-3.4	+1.8	+9.0	+15.6	+19.8	+22.6	+26.5	+27.0	
3.0	720	-16.0			-10.5	-8.5	-6.1	-2.3	+3.8	+12.0	+19.5	+23.6	+26.8	+36.0	+37.0	
4.0	720	-14.0			-10.5	-8.8	-5.5	-0.9	+6.1	+15.4	+23.0	+27.2	+31.9	+44.0	+45.0	
5.0	720	-14.0			-9.5	-7.2	-4.4	-0.5	+8.3	+19.4	+27.1	+32.8	+35.4	+49.5	+50.0	
6.0	720	-15.0			-10.3	-7.9	-4.0	+0.6	+10.8	+22.9	+31.8	+36.7	+38.8	+60.0	+61.0	
7.0	720	-19.0			-11.3	-7.9	-3.8	+1.6	+14.0	+26.5	+36.1	+42.8	+46.4	+63.0	+64.0	
8.0	720	-21.0			-10.3	-6.9	-2.5	+4.1	+16.8	+30.4	+41.0	+47.5	+50.9	+82.0	+83.0	
9.0	720	-19.0			-10.8	-7.3	-2.3	+4.3	+18.8	+34.5	+46.6	+54.7	+57.9	+95.0	+96.0	
10.0	720	-21.0			-12.3	-8.4	-2.1	+5.5	+21.4	+39.7	+53.8	+58.5	+62.4	+94.0	+95.0	
11.0	720	-19.0			-12.2	-7.7	-2.1	+6.5	+24.8	+44.2	+57.5	+62.9	+67.8	+91.0	+92.0	
12.0	720	-14.0			-9.2	-5.7	-1.1	+8.2	+28.2	+47.9	+60.5	+67.8	+70.9	+83.0	+84.0	
13.0	720	-13.0			-5.2	-2.3	+1.5	+10.7	+30.7	+48.3	+61.5	+65.7	+70.4	+75.5	+76.0	
14.0	720	-11.0			-4.2	-0.5	+3.5	+11.8	+28.9	+43.3	+57.0	+60.9	+63.9	+84.0	+85.0	
15.0	720	-11.0			-2.3	-0.1	+3.8	+11.6	+25.2	+39.1	+46.8	+50.7	+54.8	+63.0	+64.0	
16.0	720	-9.0			-3.4	-0.3	+2.5	+8.9	+20.1	+31.9	+39.0	+42.0	+44.8	+55.0	+56.0	
17.0	720	-12.0			-5.7	-1.8	+0.2	+5.2	+14.4	+29.8	+32.1	+36.4	+39.8	+44.0	+45.0	
18.0	720	-18.0			-7.9	-6.3	-2.6	+0.9	+8.3	+17.3	+23.5	+26.9	+30.9	+37.0	+38.0	
19.0	720	-13.0			-10.5	-8.7	-6.4	-2.0	+2.9	+10.9	+17.3	+22.1	+25.4	+35.0	+36.0	
20.0	720	-16.0			-10.8	-9.3	-7.8	-4.2	-0.1	+6.2	+12.0	+16.1	+21.8	+26.5	+27.0	
21.0	720	-20.0			-11.9	-10.4	-8.8	-5.7	-1.0	+3.4	+7.6	+10.2	+12.2	+21.0	+22.0	
22.0	720	-17.0			-11.7	-10.6	-9.5	-7.0	-2.4	+1.8	+5.2	+7.9	+9.5	+13.0	+14.0	
23.0	720	-18.0			-14.1	-11.7	-9.9	-7.3	-3.1	+1.0	+4.6	+6.3	+9.2	+16.0	+17.0	
24.0	720	-19.0			-15.1	-13.8	-11.4	-8.0	-2.9	+0.9	+4.8	+7.5	+9.9	+10.8	+11.0	
25.0	720	-21.0			-16.5	-13.9	-11.9	-8.2	-2.7	+2.1	+6.1	+8.9	+10.2	+13.0	+14.0	
26.0	720	-27.0			-18.9	-16.2	-13.7	-8.8	-1.9	+3.4	+7.8	+9.6	+10.6	+16.0	+17.0	
27.0	720	-25.0			-20.8	-16.7	-13.7	-8.6	-1.1	+4.5	+8.9	+10.9	+12.8	+19.0	+20.0	
28.0	9A	-17.6			-15.0	-14.1	-10.9	-7.5	1.1	7.6	14.1	15.0	17.0	17.0	17.0	
29.0	9A	-14.2			-15.4	-13.5	-9.7	-7.7	2.1	10.3	15.0	15.0	19.0	20.1	20.3	
30.0	10A	-14.7			-13.7	-12.6	-8.2	-4.7	3.7	10.2	18.3	19.3	20.0	20.4	20.4	
31.0	107	-20.1			-13.0	-12.4	-11.2	-5.3	4.4	14.0	19.4	21.3	22.0	23.7	23.8	
32.0	10A	-13.6			-13.6	-12.0	-11.7	-6.6	4.5	14.4	19.0	21.6	22.0	29.1	29.3	
33.0	10A	-14.7			-14.6	-13.5	-11.2	-5.3	4.7	15.3	21.4	24.6	25.0	26.9	27.0	
34.0	10A	-14.0			-13.0	-12.4	-11.3	-4.8	5.1	17.4	23.6	27.0	28.0	30.0	30.2	
35.0	110	-14.5			-13.0	-12.7	-11.2	-4.0	5.4	16.4	23.4	27.0	29.0	35.4	35.9	
36.0	112	-14.0			-14.0	-13.4	-10.1	-3.7	4.5	15.1	22.7	26.7	30.0	34.0	35.1	
37.0	112	-12.4			-11.8	-10.6	-9.1	-4.1	4.5	14.2	19.4	23.6	24.0	27.2	27.4	
38.0	114	-18.8			-13.0	-12.4	-10.3	-5.0	4.1	12.7	21.3	25.0	25.0	29.0	29.1	
39.0	112	-22.5			-16.0	-16.2	-15.1	-5.4	4.5	12.0	17.4	20.6	24.0	30.4	30.9	
40.0	112	-24.3			-14.0	-14.6	-14.4	-4.6	4.2	13.4	19.4	26.6	28.0	33.3	33.6	
41.0	111	-21.9			-15.0	-15.2	-13.6	-7.6	4.3	15.6	22.4	28.0	29.0	34.0	35.1	
42.0	112	-22.3			-15.0	-14.6	-13.1	-7.4	3.7	15.2	21.4	30.6	31.0	37.1	37.3	
43.0	112	-22.5			-15.0	-15.4	-12.7	-7.8	2.7	14.4	25.4	32.7	36.0	41.8	41.9	
44.0	111	-21.1			-20.0	-19.6	-13.4	-4.8	4.0	16.1	24.6	34.6	39.0	42.0	42.1	
45.0	110	-20.6			-20.6	-19.4	-13.7	-4.3	4.4	16.4	22.6	37.6	41.0	47.6	47.6	
46.0	107	-25.0			-20.0	-13.4	-12.7	-4.2	4.0	18.0	25.7	40.6	51.0	53.3	53.6	
47.0	10A	-16.0			-16.0	-15.4	-11.0	-7.3	7.1	19.7	33.0	47.4	51.0	54.1	54.3	
48.0	10A	-17.7			-17.0	-15.7	-12.4	-7.7	6.6	20.6	38.0	47.7	50.0	51.1	51.3	
49.0	10A	-17.7			-17.0	-15.4	-13.0	-7.2	6.4	20.3	39.0	46.7	50.0	50.0	51.0	
50.0	10A	-18.1			-18.0	-16.7	-14.0	-7.6	7.3	20.6	35.0	46.0	49.0	50.1	50.3	
51.0	10A	-18.0			-18.0	-16.7	-12.6	-7.1	7.3	20.6	41.0	48.4	48.0	49.4	49.4	
52.0	9A	-18.3			-15.4	-13.1	-10.0	-4.0	8.1	19.5	39.1	47.0	49.0	49.5	49.6	
53.0	9A	-14.0			-15.0	-14.2	-9.2	-4.0	4.0	21.1	37.4	46.0	49.0	49.5	49.6	
54.0	9A	-16.2			-13.0	-12.0	-8.2	-2.2	10.0	23.3	38.0	47.9	50.2	50.4	51.0	
55.0	7A	-24.7			-18.3	-15.2	-13.0	-13.3	13.3	24.1	44.4	48.4	51.3	52.1	52.2	
56.0	6A	-26.5			-18.6	-14.8	-10.5	-13.2	13.2	24.0	45.0	52.0	53.3	53.3	53.3	
57.0	5A	-14.3			-12.4	-9.4	-7.7	-10.0	25.7	49.9	49.0	51.4	52.2	52.3	52.3	
58.0	4A	-18.8			-10.0	-9.3	-0.3	-14.0	25.0	46.0	58.0	79.4	79.4	80.0	80.0	
59.0	3A	-21.0			-9.2	-8.4	-14.5	-24.6	40.3	52.4	53.0	53.4	53.4	53.6	53.6	
60.0	2A	-23.2			-9.7	-8.5	-14.5	-24.0	40.4	40.4	49.4	50.0	50.0	50.0	50.0	
61.0	1A	-25.5			-9.0	-8.0	-14.0	-24.0	40.4	32.4	32.7	32.0	33.0	33.1	33.1	
62.0	A	-17.8			-8.0	-7.0	-14.0	-24.0	40.4	26.0	47.4	47.4	47.0	48.0	48.0	
63.0	A	-5.5			-7.0	-6.0	-14.0	-24.0	40.4	33.4	33.0	34.0	34.1	34.1	34.2	
64.0	A	-6.1			-6.0	-5.0	-14.0	-24.0	40.4	30.4	39.0	40.0	40.1	40.1	40.1	
65.0	2	-5.4			-5.0	-4.0	-14.0	-24.0	40.4	27.0	38.0	38.0	38.0	38.0	38.0	
66.0	2	-24.1			-4.0	-3.0	-14.0	-24.0	40.4	24.0	37.0	37.0	37.0	37.0	37.0	
67.0	2	-3.9			-3.0	-2.0	-14.0	-24.0	40.4	21.0	36.0	36.0	36.0	36.0	36.0	
68.0	2	-26.1			-2.0	-1.0	-14.0	-24.0	40.4	18.0	35.0	35.0	35.0	35.0	35.0	
69.0	2	-27.6			-1.0	-0.5	-14.0	-24.0	40.4	15.0	34.0	34.0	34.0	34.0	34.0	
70.0	2	-37.0			-0.5	-0.2	-14.0	-24.0	40.4	12.0	33.0	33.0	33.0	33.0	33.0	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.5

DATA SOURCE										MAY				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)
SFC	744	-11.0	-10.9	-7.7	-6.7	-5.6	-3.9	-1.6	+0.4	+1.9	+3.8	+5.8	+8.9	+10.0
1.0	744	-13.0	-10.8	-10.0	-8.9	-5.4	-0.8	+0.8	+3.5	+7.9	+10.4	+12.5	+18.9	+18.0
2.0	744	-16.0	-11.9	-10.2	-8.3	-5.1	-0.4	+0.4	+5.1	+9.4	+14.0	+15.5	+17.9	+19.0
3.0	744	-20.0	-14.9	-12.1	-9.3	-6.9	-0.0	+0.2	+8.0	+11.9	+17.0	+17.9	+22.9	+24.0
4.0	744	-14.0	-13.9	-10.7	-8.0	-6.4	-3.6	+0.6	+7.7	+15.1	+18.8	+21.6	+25.4	+26.0
5.0	744	-14.0	-12.9	-9.7	-7.5	-5.6	-2.7	+1.7	+9.6	+17.1	+21.1	+22.2	+27.4	+28.0
6.0	744	-13.0	-12.9	-9.1	-8.0	-5.2	-1.7	+2.7	+12.1	+19.3	+23.0	+25.8	+28.9	+30.0
7.0	744	-14.0	-10.1	-7.5	-4.9	-1.0	+4.4	+14.0	+22.4	+25.0	+29.7	+32.9	+38.0	
8.0	744	-20.0	-9.8	-7.9	-5.5	-0.7	+6.1	+16.5	+24.5	+28.0	+32.5	+36.9	+38.0	
9.0	744	-20.0	-19.9	-10.7	-9.3	-5.5	-0.3	+7.5	+19.4	+27.1	+31.0	+34.6	+41.9	+48.0
10.0	744	-23.0	-16.9	-13.2	-10.8	-6.4	-0.1	+8.9	+22.8	+32.3	+37.7	+41.3	+49.9	+52.0
11.0	744	-22.0	-21.9	-14.3	-11.0	-7.2	+0.6	+10.7	+26.5	+36.6	+41.0	+46.5	+54.9	+57.0
12.0	744	-24.0	-22.9	-15.5	-11.0	-6.8	+1.4	+13.2	+30.2	+40.9	+46.0	+51.7	+60.9	+63.0
13.0	744	-21.0	-13.8	-10.5	-5.6	-0.4	+15.1	+32.7	+42.6	+48.6	+51.2	+59.9	+72.0	
14.0	744	-22.0	-21.9	-10.7	-7.2	-3.3	+3.4	+15.6	+39.2	+49.4	+58.7	+68.7	+80.0	
15.0	744	-21.0	-11.9	-9.1	-7.2	-4.0	+2.5	+13.2	+23.9	+35.0	+37.1	+39.7	+48.0	
16.0	744	-16.0	-14.9	-10.6	-7.8	-5.1	+1.0	+9.4	+18.7	+24.8	+26.6	+27.9	+31.4	+32.0
17.0	744	-17.0	-14.9	-9.8	-8.3	-5.7	-1.1	+5.5	+12.1	+17.5	+20.5	+22.3	+24.4	+25.0
18.0	744	-15.0	-13.9	-10.7	-9.3	-7.2	-3.4	+1.1	+7.1	+11.5	+13.8	+15.5	+20.7	+21.0
19.0	744	-13.0	-10.7	-9.9	-8.3	-5.3	-0.9	+2.8	+7.2	+8.8	+10.7	+13.9	+15.0	
20.0	744	-22.0	-14.9	-11.9	-10.7	-9.2	-6.8	-3.0	+0.6	+3.8	+5.9	+8.1	+11.9	+14.0
21.0	744	-26.0	-15.9	-13.1	-11.8	-10.4	-8.1	-4.6	-0.6	+1.6	+3.5	+5.3	+9.9	+11.0
22.0	744	-18.0	-16.9	-13.9	-13.0	-11.6	-9.5	-5.7	-1.3	+0.3	+1.9	+3.5	+7.9	+17.0
23.0	744	-18.0	-16.9	-13.9	-13.0	-11.6	-9.5	-5.7	-1.3	+0.3	+1.9	+3.5	+9.9	+13.0
24.0	744	-23.0	-20.9	-17.8	-15.6	-13.8	-11.1	-6.7	-2.2	+0.1	+0.9	+4.2	+5.6	+6.0
25.0	744	-21.0	-20.9	-18.8	-16.3	-14.6	-11.8	-6.8	-1.8	+0.0	+2.3	+3.8	+7.4	+8.0
26.0	744	-25.0	-23.9	-19.8	-18.0	-15.5	-12.1	-6.9	-1.6	+0.7	+2.7	+4.1	+8.0	+10.0
27.0	744	-25.0	-22.9	-20.9	-19.0	-15.9	-12.3	-6.6	-0.9	+1.5	+2.8	+5.2	+9.4	+10.0
28.0	105	-25.0	-22.0	-20.7	-19.3	-13.9	-10.7	-6.7	1.7	4.4	6.7	10.0	13.7	13.4
29.0	105	-25.6	-22.0	-21.4	-19.7	-13.4	-10.5	-7.7	3.0	5.9	8.0	10.7	11.3	11.4
30.0	105	-27.2	-21.4	-18.7	-13.4	-10.5	-7.7	4.4	7.0	11.6	14.0	14.6	14.6	
31.0	107	-28.1	-21.0	-20.8	-15.0	-13.0	-10.6	4.5	9.3	14.6	15.0	16.0	17.1	
32.0	110	-25.0	-21.0	-20.5	-17.4	-13.1	-10.7	5.1	10.3	11.7	12.0	14.0	15.0	
33.0	112	-24.5	-22.0	-22.2	-18.7	-12.8	-9.0	5.2	9.0	10.0	10.0	16.0	16.2	
34.0	113	-32.5	-22.0	-22.2	-18.7	-12.8	-9.0	5.3	9.0	12.0	13.0	17.0	17.5	
35.0	113	-24.4	-22.0	-22.2	-19.3	-13.8	-10.0	5.3	9.5	13.0	16.4	16.4	17.0	
36.0	113	-20.6	-20.6	-18.0	-14.1	-15.2	-10.4	5.2	8.4	11.3	12.0	13.0	19.0	19.2
37.0	114	-24.9	-21.5	-20.8	-19.4	-14.6	-10.9	5.1	9.7	11.3	14.0	14.0	18.7	18.9
38.0	112	-21.5	-22.6	-22.2	-20.1	-15.4	-10.4	0.6	7.3	12.6	16.4	20.1	20.4	
39.0	112	-22.7	-23.7	-23.2	-21.1	-16.6	-10.8	-2.2	4.1	11.0	14.4	15.4	15.4	
40.0	115	-23.7	-24.7	-23.1	-19.1	-14.1	-11.7	-3.5	4.1	9.0	10.8	13.1	13.3	
41.0	116	-26.1	-25.8	-24.7	-23.4	-14.0	-12.3	-3.7	5.1	11.0	14.4	18.0	18.4	
42.0	116	-24.9	-25.8	-24.7	-23.4	-14.0	-12.3	-3.7	5.1	11.0	14.4	18.0	18.4	
43.0	113	-25.4	-28.0	-26.2	-23.2	-15.0	-12.0	-5.0	4.4	9.0	14.0	24.7	24.9	
44.0	112	-28.9	-28.0	-26.2	-23.2	-15.0	-12.0	-5.0	1.7	4.6	10.0	15.4	15.5	
45.0	111	-37.8	-29.0	-26.2	-23.2	-15.0	-12.0	-5.0	1.7	4.6	7.0	14.0	15.1	
46.0	104	-40.9	-34.0	-30.2	-24.4	-15.0	-15.0	-5.1	2.6	4.0	5.0	18.5	18.6	
47.0	107	-41.0	-37.0	-31.4	-29.7	-25.1	-16.0	-7.5	-0.4	5.6	4.0	12.8	12.9	
48.0	106	-41.3	-37.0	-31.4	-29.7	-25.1	-16.0	-7.5	-0.4	5.6	4.0	11.2	11.5	
49.0	104	-41.7	-34.0	-32.4	-31.3	-25.7	-16.8	-0.3	0.8	5.6	9.0	12.0	12.2	
50.0	100	-47.0	-42.0	-34.7	-33.5	-26.8	-17.7	-0.2	-3.0	2.7	5.0	9.1	9.3	
51.0	98	-35.6	-35.4	-35.1	-29.5	-19.6	-14.8	-8.8	-1.4	3.0	4.0	9.0	9.2	
52.0	95	-40.7	-38.0	-35.2	-30.0	-19.0	-14.0	-7.6	0.5	6.0	15.1	15.5	15.6	
53.0	90	-41.9	-40.1	-34.7	-29.3	-19.2	-14.7	-7.5	1.9	5.1	10.1	10.8	10.9	
54.0	85	-45.2	-40.1	-34.7	-29.3	-19.2	-14.7	-7.5	1.9	5.1	10.1	10.8	10.9	
55.0	74	-57.9	-49.3	-42.7	-38.7	-31.2	-19.0	-4.5	1.7	3.7	10.2	10.6	10.7	
56.0	66	-50.8	-47.5	-41.1	-37.0	-32.0	-17.7	-6.0	6.2	4.7	14.4	15.2	15.3	
57.0	57	-44.3	-47.5	-41.1	-37.0	-32.0	-17.7	-6.0	6.2	4.7	14.4	15.2	15.3	
58.0	43	-50.4	-41.8	-37.2	-33.8	-27.8	-17.5	-4.6	7.9	31.0	31.6	31.0	32.0	
59.0	33	-44.7	-39.3	-33.8	-27.8	-17.5	-4.6	7.9	31.0	31.6	31.0	31.0	31.0	
60.0	20	-40.0	-40.0	-37.8	-37.8	-19.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
61.0	12	-51.2	-44.1	-44.1	-44.1	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
62.0	9	-47.1	-43.4	-43.4	-43.4	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
63.0	2	-41.5	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
64.0	2	-37.4	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
65.0	2	-41.1	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
66.0	1	-45.4	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
67.0	1	-34.1	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
68.0	1	-37.6	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
69.0	1	-37.7	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	
70.0	1	-35.3	-41.0	-41.0	-41.0	-20.0	-14.0	-7.8	22.0	23.4	23.4	24.0	24.0	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.6

DATA SOURCE							JUNE							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY	99.000	99.865	MAX DIR SPEED (DEG)			
SFC	720	-10.0		-6.9	-5.9	-4.9	-3.1	-0.9	+0.6	+2.6	+3.6	+4.4	+9.0	+10.0
1.0	720	-20.0		-9.5	-8.2	-7.2	-4.3	-0.2	+4.4	+8.2	+10.2	+12.4	+22.0	+23.0
2.0	720	-10.0		-8.7	-7.5	-6.2	-3.3	+0.3	+5.3	+8.9	+10.5	+13.2	+24.0	+27.0
3.0	720	-11.0		-7.7	-6.5	-5.3	-2.6	+0.8	+5.5	+9.0	+11.1	+14.9	+25.0	+26.0
4.0	720	-11.0		-6.9	-6.1	-5.0	-2.4	+1.1	+5.8	+10.2	+12.8	+16.2	+30.0	+31.0
5.0	720	-11.0		-8.1	-6.5	-4.9	-2.3	+1.0	+6.6	+10.5	+12.7	+16.9	+22.0	+23.0
6.0	720	-13.0		-8.6	-6.8	-5.7	-2.6	+1.1	+7.3	+11.5	+14.7	+19.7	+20.6	+21.0
7.0	720	-16.0		-10.2	-8.6	-6.1	-3.2	+1.8	+8.7	+13.4	+16.7	+19.3	+25.0	+26.0
8.0	720	-13.0		-11.2	-9.6	-7.4	-3.4	+2.1	+9.5	+15.4	+18.9	+21.7	+24.0	+25.0
9.0	720	-17.0		-13.4	-10.8	-8.5	-4.0	+2.8	+11.8	+17.5	+22.6	+24.9	+29.0	+30.0
10.0	720	-23.0		-14.8	-14.1	-10.2	-4.7	+3.6	+13.2	+21.0	+25.5	+29.6	+32.0	+33.0
11.0	720	-32.0		-20.7	-16.5	-11.7	-5.4	+4.1	+15.2	+24.4	+30.5	+32.9	+40.0	+41.0
12.0	720	-32.0		-22.2	-18.5	-14.1	-6.1	+4.6	+18.2	+29.0	+34.5	+38.4	+46.0	+47.0
13.0	720	-29.0		-24.9	-21.8	-15.3	-6.3	+5.4	+17.9	+31.0	+36.7	+42.6	+50.0	+51.0
14.0	720	-27.0		-22.9	-19.7	-14.1	-6.3	+4.5	+16.1	+27.3	+33.3	+38.3	+43.0	+44.0
15.0	720	-29.0		-19.8	-17.1	-13.4	-6.6	+2.0	+11.4	+19.6	+25.5	+28.3	+36.0	+37.0
16.0	720	-21.0		-16.4	-14.5	-11.8	-7.2	+0.3	+5.9	+11.4	+15.7	+18.5	+21.5	+22.0
17.0	720	-21.0		-15.1	-12.7	-10.6	-7.5	-2.1	+2.1	+6.0	+7.6	+9.2	+12.0	+13.0
18.0	720	-21.0		-14.6	-12.7	-11.6	-8.7	-0.7	+1.5	+3.0	+4.4	+6.0	+7.0	+8.0
19.0	720	-23.0		-14.9	-13.9	-12.6	-10.5	-6.5	-2.7	+0.7	+0.1	+0.6	+2.6	+3.0
20.0	720	-24.0		-18.7	-15.9	-14.8	-12.0	-8.2	-4.4	-2.4	-1.6	-0.8	+2.0	+3.0
21.0	720	-27.0		-18.9	-16.9	-15.6	-13.1	-9.8	-6.1	-3.7	-2.4	-0.3	+1.0	+2.0
22.0	720	-21.0		-19.4	-17.9	-16.7	-14.6	-10.9	-7.4	-5.0	-3.8	-2.4	-0.3	+0.0
23.0	720	-25.0		-20.5	-19.7	-18.4	-15.7	-12.1	-8.1	-6.1	-4.4	-3.1	+3.0	+4.0
24.0	720	-23.0		-21.6	-20.4	-19.4	-17.0	-12.7	-8.6	-6.1	-5.0	-3.2	-0.4	+0.0
25.0	720	-27.0		-23.6	-21.7	-20.4	-18.1	-13.4	-9.0	-6.3	-4.6	-3.0	-0.9	+0.0
26.0	720	-26.0		-24.3	-23.1	-21.3	-18.7	-13.8	-9.2	-6.2	-4.6	-3.0	-1.4	+1.0
27.0	720	-30.0		-25.6	-23.8	-22.1	-19.3	-14.3	-8.6	-5.9	-4.4	-2.5	+0.0	+1.0
28.0	103	-28.5		-25.0	-24.7	-22.5	-20.0	-15.1	-9.7	-6.1	-4.1	-1.8	-0.8	+3.0
29.0	104	-26.4		-25.0	-24.8	-22.8	-19.0	-15.2	-9.3	-5.1	-2.9	-1.0	-1.4	+1.3
30.0	107	-27.3		-25.0	-24.6	-22.4	-19.8	-15.6	-9.0	-3.6	-2.7	-0.9	-1.1	-0.9
31.0	104	-28.5		-27.0	-25.5	-24.5	-21.5	-15.2	-7.8	-5.1	-3.5	-2.1	-1.3	-1.2
32.0	109	-28.7		-28.6	-25.8	-25.8	-21.2	-15.2	-7.1	-4.5	-3.2	-2.6	-2.3	-2.2
33.0	104	-28.3			-25.8	-25.8	-22.5	-15.1	-7.8	-4.3	-3.2	-2.1	-0.7	-0.5
34.0	111	-32.6		-31.0	-28.5	-26.2	-22.8	-15.8	-7.0	-3.5	-1.5	-0.3	-0.1	-0.2
35.0	111	-36.1			-34.5	-26.4	-22.7	-17.5	-9.8	-3.0	-3.1	-1.1	-0.4	-0.3
36.0	111	-35.5		-32.0	-30.8	-29.0	-25.1	-19.0	-11.5	-7.5	-5.5	-3.1	-0.8	-0.7
37.0	110	-34.2			-33.5	-31.5	-26.1	-20.8	-11.0	-9.2	-6.5	-4.1	-2.2	-2.1
38.0	110	-35.9			-36.5	-31.8	-27.8	-21.4	-18.2	-11.5	-10.5	-8.1	-7.8	-7.2
39.0	110	-37.3		-36.0	-36.2	-33.0	-29.8	-23.8	-16.4	-11.5	-8.6	-7.6	-7.1	-7.2
40.0	110	-44.5		-40.0	-36.8	-35.5	-31.1	-25.0	-18.1	-14.2	-12.0	-12.1	-10.0	-9.4
41.0	110	-51.9		-50.0	-41.5	-38.2	-33.8	-25.0	-20.1	-15.4	-13.0	-13.1	-10.4	-10.2
42.0	109	-47.5		-46.0	-41.5	-39.4	-35.8	-28.1	-21.8	-19.1	-17.2	-16.1	-13.5	-13.4
43.0	109	-44.0			-43.8	-41.8	-38.7	-29.0	-23.8	-20.7	-18.7	-18.0	-15.7	-15.5
44.0	109	-49.9		-44.0	-44.6	-43.6	-39.1	-32.1	-26.0	-22.5	-21.5	-21.0	-19.1	-19.9
45.0	109	-48.6		-47.0	-46.8	-44.8	-39.5	-32.5	-25.6	-23.4	-22.5	-21.1	-19.2	-19.1
46.0	104	-51.4		-50.0	-49.5	-46.8	-41.1	-33.8	-26.0	-22.8	-21.9	-21.0	-19.4	-19.3
47.0	107	-52.6		-52.6	-51.4	-49.3	-42.0	-34.7	-27.0	-23.8	-20.7	-20.0	-18.2	-19.1
48.0	101	-56.5		-55.0	-54.0	-49.0	-43.5	-36.1	-28.4	-23.8	-21.9	-19.0	-18.3	-19.1
49.0	100	-68.2		-68.0	-58.0	-52.0	-45.1	-35.0	-28.5	-24.0	-21.4	-20.0	-18.3	-18.2
50.0	92	-58.4			-54.0	-51.7	-47.8	-38.0	-27.2	-23.8	-22.0	-19.0	-18.8	-19.7
51.0	89	-74.0			-58.5	-52.5	-47.0	-35.6	-26.0	-22.2	-19.6	-19.0	-18.2	-18.1
52.0	80	-67.8			-56.2	-54.7	-47.8	-37.0	-28.8	-23.0	-19.8	-19.4	-18.1	-18.0
53.0	75	-75.1			-61.8	-57.2	-49.1	-38.2	-28.8	-25.4	-24.7	-16.6	-15.7	-15.5
54.0	73	-59.9			-57.8	-55.8	-49.7	-40.8	-30.6	-25.4	-16.7	-19.8	-18.4	-18.3
55.0	70	-61.3			-56.7	-55.8	-51.0	-40.7	-31.7	-27.7	-26.6	-5.6	-4.7	-4.6
56.0	66	-50.8			-59.7	-57.7	-50.5	-41.8	-31.5	-27.8	-26.8	-19.7	-19.8	-19.2
57.0	62	-61.1			-60.6	-56.0	-49.7	-39.0	-31.2	-19.1	-9.8	4.8	4.9	5.0
58.0	52	-62.9			-61.8	-60.7	-53.0	-39.0	-31.1	-15.6	-8.0	31.7	32.8	32.4
59.0	40	-68.8				-62.5	-53.7	-41.0	-28.8	-10.0	0.1	0.3	1.4	1.4
60.0	31	-71.9				-66.7	-60.1	-42.7	-29.0	-9.5	3.7	3.7	4.0	4.0
61.0	23	-73.2				-68.0	-67.0	-46.5	-14.6	-7.1	-6.0	-5.7	-5.7	-5.7
62.0	14	-71.4					-68.4	-50.0	-17.2	-1.7	-1.0	-1.2	-1.1	-1.1
63.0	6	-89.0						-62.0	-0.0	-0.8	-0.8	-0.2	-0.2	-0.2
64.0	2	-70.9						-71.0	-50.4	-50.2	-50.1	-50.1	-50.1	-50.1
65.0	2	-70.9							-54.5	-54.4	-54.4	-54.4	-54.4	-54.4
66.0	1	-60.4												-60.4
67.0	1	-61.0												-61.0
68.0	1	-60.9												-60.9

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.7

DATA SOURCE										JULY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	744	-6.0			-5.2	-4.7	-3.9	-2.5	-0.5	+0.9	+2.4	+3.2	+4.1	+6.6	+7.0
1.0	744	-11.0	-10.9		-8.5	-6.9	-5.3	-2.4	+0.3	+4.6	+7.8	+10.0	+12.5	+17.9	+20.0
2.0	744	-12.0			-9.1	-6.9	-5.2	-2.2	+0.5	+5.2	+8.1	+10.5	+12.1	+19.9	+21.0
3.0	744	-15.0	-11.9		-8.1	-6.6	-4.9	-2.1	+0.6	+5.2	+8.8	+10.6	+12.5	+18.9	+20.0
4.0	744	-12.0	-10.9		-8.8	-6.5	-4.9	-2.4	+0.4	+5.4	+9.3	+10.8	+12.5	+17.9	+22.0
5.0	744	-10.0			-7.4	-6.7	-5.6	-2.8	+0.1	+4.9	+8.4	+10.4	+12.7	+17.4	+18.0
6.0	744	-12.0	-11.9		-10.1	-7.8	-6.1	-3.4	-0.1	+4.5	+8.0	+9.8	+12.8	+16.9	+23.0
7.0	744	-15.0			-9.9	-8.9	-7.4	-4.1	-0.4	+4.3	+7.6	+9.8	+11.1	+15.9	+17.0
8.0	744	-20.0	-19.9		-13.1	-10.6	-8.1	-5.2	-0.7	+3.9	+8.5	+10.7	+13.2	+16.9	+18.0
9.0	744	-22.0			-16.2	-13.6	-10.9	-6.7	-1.1	+4.2	+9.8	+13.0	+14.5	+18.9	+22.0
10.0	744	-24.0			-20.2	-17.0	-12.7	-8.4	-1.6	+4.5	+10.2	+15.5	+17.9	+19.9	+24.0
11.0	744	-28.0	-27.9		-25.1	-18.3	-15.2	-10.1	-2.4	+4.9	+12.4	+16.5	+20.1	+22.9	+24.0
12.0	744	-31.0	-30.9		-30.9	-26.2	-22.7	-19.1	-12.2	-3.3	+5.3	+13.1	+17.6	+19.8	+27.0
13.0	744	-33.0	-31.9		-29.1	-26.5	-20.5	-13.7	-4.7	+4.9	+12.3	+16.5	+20.5	+24.9	+28.0
14.0	744	-33.0	-32.9		-26.5	-21.3	-17.8	-13.1	-5.5	+2.9	+8.5	+14.0	+18.8	+22.9	+24.0
15.0	744	-28.0	-26.9		-22.5	-18.4	-15.6	-11.6	-5.8	+0.0	+4.4	+7.5	+11.8	+14.9	+20.0
16.0	744	-21.0	-20.9		-17.5	-15.2	-13.7	-10.7	-5.9	-0.9	+1.5	+3.2	+4.5	+8.9	+11.0
17.0	744	-17.0	-15.9		-14.6	-13.6	-12.5	-10.2	-6.5	-2.9	-0.5	+0.0	+2.1	+3.9	+5.0
18.0	744	-17.0	-17.9		-15.4	-14.0	-12.9	-11.2	-8.1	-5.2	-3.2	-2.4	-1.8	-0.2	+0.0
19.0	744	-24.0	-19.9		-17.4	-16.0	-14.9	-13.1	-10.2	-7.4	-5.3	-4.1	-3.3	-2.2	-2.0
20.0	744	-23.0	-22.9		-20.9	-19.7	-18.7	-15.9	-12.5	-9.1	-6.9	-5.4	-4.2	-3.0	-1.0
21.0	744	-28.0	-26.9		-23.4	-21.8	-20.4	-17.8	-14.2	-11.1	-9.0	-8.1	-6.8	-4.0	-3.0
22.0	744	-32.0	-26.9		-24.5	-22.6	-21.2	-19.1	-15.4	-12.7	-11.0	-10.1	-9.1	-5.0	-3.0
23.0	744	-31.0	-27.9		-24.9	-23.6	-22.2	-20.3	-16.7	-13.5	-11.5	-10.3	-9.4	-6.0	-3.0
24.0	744	-31.0	-27.9		-25.8	-25.1	-23.9	-21.4	-17.9	-14.4	-12.2	-11.2	-10.2	-5.5	-5.0
25.0	744	-30.0	-27.9		-26.7	-26.7	-25.1	-22.6	-18.9	-14.8	-12.5	-11.1	-10.0	-8.0	-5.0
26.0	744	-31.0	-29.9		-27.3	-27.8	-26.2	-23.5	-19.6	-14.8	-12.2	-11.2	-10.0	-7.0	+11.0
27.0	744	-32.0	-30.5		-27.2	-27.8	-24.5	-19.7	-14.5	-12.2	-10.4	-9.0	-7.0	-6.0	-3.0
28.0	105	-31.4	-31.0		-30.3	-27.6	-26.0	-20.6	-16.4	-13.1	-12.1	-10.1	-7.4	-7.7	
29.0	104	-32.3	-30.0		-29.8	-28.7	-26.2	-21.5	-17.1	-14.2	-10.1	-10.1	-8.2	-8.1	
30.0	111	-34.9	-30.0		-31.5	-29.4	-26.1	-22.9	-18.5	-14.4	-13.6	-13.0	-12.4	-12.3	
31.0	112	-34.5	-33.0		-33.2	-30.4	-27.1	-22.1	-14.4	-14.3	-13.0	-11.1	-9.1	-9.0	
32.0	113	-33.6	-33.0		-32.6	-31.2	-27.2	-22.0	-17.3	-15.5	-13.6	-12.1	-9.3	-9.2	
33.0	117	-35.5	-33.0		-32.7	-31.1	-27.3	-22.5	-17.7	-15.8	-14.4	-12.2	-10.4	-10.3	
34.0	121	-35.1	-34.0		-33.7	-32.5	-29.2	-24.6	-18.3	-15.0	-13.0	-13.2	-12.7	-12.5	
35.0	122	-40.6	-34.0		-37.7	-35.4	-30.9	-24.7	-19.4	-17.0	-14.0	-14.0	-11.5	-11.4	
36.0	122	-41.4	-34.0		-37.4	-35.3	-31.5	-26.7	-21.7	-19.0	-15.0	-13.2	-12.2	-12.1	
37.0	122	-43.0	-40.0		-38.2	-37.2	-34.1	-28.6	-24.5	-19.1	-17.0	-15.0	-13.0	-13.7	
38.0	124	-42.6	-42.0		-41.6	-39.4	-34.0	-30.5	-24.0	-18.6	-13.0	-13.1	-13.0	-13.0	
39.0	125	-42.2			-41.7	-40.2	-37.1	-31.2	-25.6	-20.6	-14.0	-14.2	-14.2	-14.2	
40.0	125	-45.5			-43.8	-42.7	-39.4	-32.4	-27.8	-23.4	-19.1	-19.1	-19.1	-19.1	
41.0	125	-48.7	-47.7		-46.7	-45.4	-41.2	-34.3	-29.3	-24.1	-20.0	-20.0	-20.0	-20.0	
42.0	124	-50.0	-49.0		-49.1	-46.6	-43.2	-37.3	-31.5	-27.2	-23.0	-23.0	-23.0	-23.0	
43.0	124	-53.2			-51.6	-49.0	-45.4	-39.4	-33.4	-27.1	-22.9	-22.9	-22.9	-22.9	
44.0	122	-54.1	-53.0		-53.5	-51.8	-48.4	-42.2	-34.5	-29.5	-26.0	-22.2	-20.1	-19.9	
45.0	121	-60.2	-57.0		-56.6	-53.0	-49.7	-43.4	-35.6	-29.8	-27.0	-26.2	-24.0	-23.4	
46.0	119	-59.3			-57.0	-52.0	-44.7	-37.0	-30.0	-27.7	-26.2	-23.7	-23.7	-23.7	
47.0	118	-60.9			-60.7	-57.8	-53.3	-46.7	-36.0	-30.0	-27.7	-24.2	-22.1	-21.9	
48.0	117	-60.5	-59.0		-58.3	-57.3	-54.2	-48.4	-38.5	-32.5	-28.7	-21.2	-15.2	-15.2	
49.0	115	-60.6	-60.0		-59.7	-57.9	-54.7	-48.7	-38.6	-34.0	-31.6	-27.1	-23.1	-22.9	
50.0	113	-60.3			-59.3	-54.8	-48.1	-39.0	-34.0	-32.6	-27.6	-26.1	-24.7	-24.5	
51.0	110	-63.0			-61.8	-59.8	-55.0	-48.6	-38.6	-34.6	-29.7	-25.0	-25.1	-22.5	-22.4
52.0	108	-66.9	-66.0		-65.3	-62.3	-57.3	-48.3	-36.1	-34.2	-29.7	-22.0	-20.3	-20.2	
53.0	103	-68.3	-66.0		-64.7	-62.4	-58.7	-47.7	-36.1	-34.1	-29.7	-22.0	-15.3	-15.1	-15.1
54.0	97	-68.4			-63.6	-61.7	-57.6	-46.0	-35.1	-27.8	-23.2	-20.2	-19.6	-19.5	
55.0	80	-68.7			-63.0	-60.5	-55.7	-46.7	-33.1	-25.2	-21.5	-19.0	-19.1	-19.0	
56.0	84	-67.1			-65.1	-59.0	-56.0	-47.2	-31.7	-19.2	-10.0	-1.0	-1.4	-1.3	
57.0	77	-66.3			-65.2	-63.1	-57.6	-47.6	-32.2	-20.0	-10.8	-0.7	0.3	0.4	
58.0	66	-71.6			-65.5	-62.4	-59.2	-47.0	-33.1	-20.3	-10.5	-0.5	-0.1	-0.1	
59.0	56	-68.1			-65.0	-61.1	-54.5	-41.5	-28.0	-12.4	-11.3	-7.3	-6.6	-6.5	
60.0	41	-72.5			-67.0	-62.5	-50.2	-35.5	-25.5	-12.0	-10.0	-9.4	-9.3	-9.3	
61.0	25	-81.5				-80.7	-72.0	-56.2	-26.0	-10.2	-17.2	-17.4	-17.5	-17.5	
62.0	18	-89.9					-78.6	-55.3	-25.4	-8.0	-8.6	-8.6	-8.6	-8.6	
63.0	11	-90.2					-87.3	-50.5	-25.7	-21.4	-21.1	-20.0	-20.0	-20.0	
64.0	9	-90.1					-85.6	-36.5	-16.4	-13.7	-13.6	-13.6	-13.6	-13.6	
65.0	9	-72.5					-56.6	-47.6	-32.4	-19.3	-19.0	-19.0	-19.0	-19.0	
66.0	5	-77.9					-44.6	-17.8	-17.4	-17.3	-17.2	-17.2	-17.2	-17.2	
67.0	4	-118.5					-40.0	-6.7	-6.2	-6.1	-6.1	-6.1	-6.1	-6.1	
68.0	5	-64.8					-40.6	-8.8	-4.2	-8.0	-8.0	-7.9	-7.9	-7.9	
69.0	5	-41.1					-29.5	-21.3	-21.6	-21.6	-21.6	-21.6	-21.6	-21.6	
70.0	5	-50.1					-22.6	-10.7	-9.0	-9.7	-9.7	-9.6	-9.6	-9.6	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.8

DATA SOURCE							AUGUST									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.155	1.000	2.280		CUMULATIVE	PERCENTAGE FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)
5FC	744	-9.0		-8.9	-4.9	-4.3		-3.5	-2.4	-0.6	+0.6	+2.3	+3.2	+3.8	+6.4	+7.0
1.0	744	-18.0		-15.9	-8.5	-7.1		-5.8	-3.6	-0.3	+4.2	+6.9	+8.7	+10.8	+15.9	+17.0
2.0	744	-20.0		-13.9	-6.2	-4.8		-3.2	-0.2	+4.6	+7.2	+8.9	+10.8	+16.9	+18.0	
3.0	744	-20.0		-13.9	-6.5	-6.8	-5.6	-3.3	-0.1	+4.8	+8.1	+9.6	+12.1	+14.9	+16.0	
4.0	744	-20.0		-13.9	-6.5	-7.4	-5.7	-3.4	-0.0	+4.7	+8.5	+9.9	+12.8	+16.9	+18.0	
5.0	744	-20.0		-14.9	-9.8	-7.6	-6.2	-3.4	-0.0	+4.9	+9.4	+11.1	+14.2	+17.4	+18.0	
6.0	744	-17.0		-13.9	-10.7	-8.8	-6.8	-4.1	-0.2	+4.8	+8.7	+11.5	+15.2	+19.9	+21.0	
7.0	744	-14.0			-11.1	-9.6	-7.7	-4.7	-0.3	+4.6	+8.4	+10.8	+14.7	+20.9	+22.0	
8.0	744	-15.0			-12.6	-10.7	-8.7	-5.4	-0.6	+4.2	+8.6	+11.0	+13.5	+16.9	+22.0	
9.0	744	-18.0		-17.9	-14.5	-12.5	-10.5	-6.0	-0.7	+4.6	+8.2	+11.3	+14.1	+18.9	+25.0	
10.0	744	-23.0			-19.5	-15.7	-12.8	-7.4	-0.6	+5.3	+9.2	+12.8	+15.8	+20.9	+35.0	
11.0	744	-28.0			-21.5	-19.4	-14.6	-8.9	-0.7	+6.2	+10.8	+14.5	+17.8	+23.9	+32.0	
12.0	744	-35.0		-30.9	-23.7	-20.6	-17.4	-10.5	-0.8	+6.9	+12.3	+15.5	+19.1	+23.9	+25.0	
13.0	744	-35.0		-30.9	-23.7	-20.6	-18.1	-11.8	-0.9	+7.1	+12.0	+15.5	+19.1	+21.9	+25.0	
14.0	744	-30.0			-24.2	-21.0	-16.7	-10.7	-2.4	+5.7	+9.8	+13.4	+15.5	+18.9	+22.0	
15.0	744	-30.0			-24.9	-21.8	-15.6	-13.3	-9.2	-2.9	+2.6	+7.0	+8.6	+11.7	+15.0	
16.0	744	-22.0			-20.9	-14.9	-13.5	-11.4	-8.4	-4.0	+0.1	+2.9	+4.5	+6.1	+7.9	
17.0	744	-20.0		-15.9	-13.6	-12.8	-11.8	-9.3	-5.5	-1.6	-0.1	+0.7	+1.6	+3.9	+6.0	
18.0	744	-16.0			-14.9	-13.8	-12.8	-10.6	-7.6	-4.4	-2.0	-1.1	-0.6	-0.0	+0.0	
19.0	744	-21.0		-19.9	-17.2	-16.5	-15.5	-13.2	-9.9	-6.8	-4.4	-3.4	-2.9	-1.0	+0.0	
20.0	744	-31.0		-22.9	-20.6	-19.7	-18.4	-15.9	-12.3	-9.0	-6.7	-5.9	-5.0	-1.0		
21.0	744	-37.0		-23.9	-22.5	-21.0	-20.0	-17.6	-14.0	-11.0	-9.0	-7.8	-6.7	-5.5	-5.0	
22.0	744	-38.0		-25.9	-22.7	-21.9	-21.1	-19.0	-15.4	-12.5	-10.6	-9.6	-8.9	-7.5	-7.0	
23.0	744	-38.0		-27.9	-24.7	-23.9	-22.3	-19.9	-16.3	-13.3	-11.3	-10.2	-9.0	-7.0	-3.0	
24.0	744	-38.0		-29.9	-27.1	-25.1	-23.6	-21.1	-17.5	-13.8	-11.7	-10.4	-9.6	-8.0	+5.0	
25.0	744	-41.0		-31.9	-28.8	-27.0	-24.9	-22.1	-18.2	-14.7	-12.6	-11.7	-11.0	-9.0	-7.0	
26.0	744	-33.0			-30.4	-28.1	-26.0	-22.8	-19.0	-15.0	-12.9	-11.3	-10.0	-8.0	-4.0	
27.0	744	-41.0		-33.9	-31.3	-29.1	-27.2	-23.8	-19.7	-15.3	-12.7	-11.6	-10.4	-8.5	-8.0	
28.0	110	-27.2				-26.4	-24.7	-20.0	-16.4	-13.4	-12.6	-12.5	-10.1	-9.3	-9.2	
29.0	113	-29.1				-27.3	-25.4	-21.4	-17.0	-15.1	-14.0	-14.0	-13.1	-12.2	-12.1	
30.0	113	-31.7		-31.6	-30.4	-28.7	-25.8	-21.4	-17.2	-14.6	-14.1	-14.1	-13.5	-12.9	-12.4	
31.0	115	-41.7		-32.0	-30.2	-29.2	-26.4	-21.6	-17.7	-15.4	-13.0	-13.0	-13.1	-11.0	-11.3	
32.0	115	-37.3		-31.0	-30.0	-29.4	-27.1	-21.8	-17.1	-13.0	-11.3	-11.3	-10.4	-9.7	-9.5	
33.0	115	-37.0		-32.8	-31.4	-29.6	-27.0	-21.7	-17.3	-13.4	-11.6	-11.6	-11.1	-10.4	-10.3	
34.0	117	-37.3		-31.0	-30.7	-27.0	-22.6	-17.7	-12.9	-10.7	-10.7	-10.7	-9.2	-7.4	-7.4	
35.0	114	-35.1				-35.7	-33.1	-29.2	-24.4	-16.7	-12.4	-10.8	-10.1	-7.0	0.0	
36.0	114	-37.7				-37.3	-32.8	-29.7	-24.6	-17.4	-12.9	-10.9	-10.2	20.4	21.0	
37.0	120	-36.4					-35.3	-31.2	-25.3	-16.4	-13.0	-10.7	-7.7	11.7	11.8	
38.0	120	-42.5		-39.0	-38.4	-37.0	-32.0	-26.1	-19.0	-11.3	-6.7	-3.7	-3.2	12.4	13.0	
39.0	120	-43.7		-43.5	-42.3	-40.0	-32.0	-24.2	-18.4	-14.0	-10.4	-7.4	-7.1	0.2	0.4	
40.0	119	-45.7		-45.6	-43.3	-41.5	-35.0	-25.4	-19.6	-14.6	-11.7	-10.2	-9.4	-8.2		
41.0	117	-46.2		-42.0	-40.4	-39.4	-35.7	-28.9	-21.4	-14.0	-11.7	-10.2	-9.3	-8.2		
42.0	117	-45.3		-44.4	-43.8	-42.7	-37.4	-30.6	-22.7	-15.4	-13.7	-12.2	-10.9	-9.4	20.1	
43.0	117	-50.0		-47.8	-46.3	-45.1	-41.3	-32.0	-21.9	-16.4	-12.0	-12.1	-11.6	-11.5		
44.0	115	-56.8		-52.0	-50.2	-48.2	-43.6	-32.8	-21.4	-13.7	-7.4	-6.2	-5.1	-4.0		
45.0	114	-57.9		-56.0	-54.4	-51.1	-43.0	-33.6	-21.4	-17.7	-15.4	-12.1	-11.4	-11.3		
46.0	113	-59.5		-56.4	-52.4	-50.4	-43.1	-32.6	-21.0	-18.1	-16.5	-13.0	-12.1	-11.1	-6.0	
47.0	110	-64.9		-56.0	-51.7	-50.2	-44.4	-34.3	-21.1	-16.7	-14.8	-14.1	-13.4	-10.4	-10.6	
48.0	110	-59.0		-57.0	-53.5	-51.2	-43.4	-32.0	-22.4	-15.7	-13.3	-10.1	-10.1	-9.0	-5.7	
49.0	104	-56.4			-54.5	-50.6	-43.3	-31.1	-22.0	-15.7	-13.9	-12.7	-12.4	-12.4	-12.4	
50.0	105	-61.0		-59.0	-55.0	-51.7	-42.7	-30.0	-21.9	-13.4	-11.2	-10.2	-9.1	-4.0	-4.0	
51.0	105	-71.6		-56.0	-50.6	-50.0	-46.7	-31.7	-18.0	-11.9	-10.2	-9.7	-9.0	5.1	5.3	
52.0	98	-85.6		-56.4	-53.1	-50.4	-43.5	-28.7	-15.4	-9.3	-4.2	-3.0	-2.0	99.1	99.3	
53.0	96	-64.6		-56.4	-52.4	-50.9	-45.6	-29.5	-11.4	-1.5	5.0	11.1	11.6	11.6		
54.0	91	-67.6		-56.4	-50.9	-41.4	-29.6	-10.2	-2.1	12.1	16.2	16.2	16.4	16.9		
55.0	83	-64.9		-56.4	-50.9	-41.4	-29.6	-10.2	-2.1	12.1	16.2	16.2	16.4	16.9		
56.0	75	-71.4		-56.4	-50.9	-41.4	-29.6	-10.2	-2.1	12.1	16.2	16.2	16.4	16.9		
57.0	61	-67.8		-56.4	-53.5	-53.4	-38.3	-20.5	-4.7	5.0	21.4	21.4	22.3	22.3		
58.0	44	-54.9		-56.4	-53.6	-53.4	-36.4	-17.0	0.4	15.4	22.0	27.5	27.4	27.4		
59.0	37	-54.4			-50.1	-32.6	-11.5	10.1	28.2	46.1	46.5	46.7	46.7	46.9		
60.0	27	-53.3			-45.6	-39.7	-10.5	1.9	15.7	22.4	22.7	23.0	23.0	23.0		
61.0	27	-60.5			-59.6	-40.4	-4.0	-0.5	14.4	17.7	26.4	26.4	27.0	27.0		
62.0	13	-50.3				-41.0	-14.0	11.0	15.1	15.1	15.1	16.1	16.1	16.1		
63.0	16	-61.9				-41.5	-10.4	9.5	17.3	17.3	17.3	18.1	18.1	18.1		
64.0	10	-20.8				-25.4	-17.0	5.4	20.4	20.4	20.4	20.4	20.4	20.4		
65.0	4	-43.9				-25.4	-16.0	-11.3	15.4	16.1	16.2	16.3	16.3	16.3		
66.0	7	-45.7				-25.4	-17.0	-11.3	10.4	10.4	10.4	10.4	10.4	10.4		
67.0	6	-51.0				-23.5	-11.0	-10.5	-10.4	-10.4	-10.4	-10.3	-10.3	-10.3		
68.0	5	-35.0				-17.5	-7.7	-6.9	-6.7	-6.7	-6.7	-6.6	-6.6	-6.6		
69.0	4	-22.9				-10.0	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4		
70.0	4	-21.7				-10.0	0.5	10.1	10.1	10.1	10.1	10.1	10.1	10.1		

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.9

DATA SOURCE										SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-12.0			-9.8	-8.1	-6.5	-4.3	-1.5	-0.0	+1.6	+2.9	+4.5	+12.0	+13.0	
1.0	720	-23.0			-17.7	-13.2	-10.3	-7.0	-2.2	+2.3	+7.1	+12.6	+16.8	+23.0	+24.0	
2.0	720	-25.0			-16.9	-11.5	-9.4	-6.0	-1.1	+4.0	+9.2	+13.8	+18.2	+34.0	+35.0	
3.0	720	-24.0			-15.3	-9.5	-8.1	-5.2	-0.5	+5.0	+10.9	+13.5	+17.6	+38.0	+39.0	
4.0	720	-25.0			-12.3	-9.2	-7.5	-4.7	-0.4	+5.6	+11.5	+14.1	+16.9	+35.0	+36.0	
5.0	720	-28.0			-11.9	-8.9	-7.5	-4.8	-0.2	+6.2	+12.8	+15.4	+17.4	+33.0	+34.0	
6.0	720	-30.0			-12.4	-10.4	-8.3	-4.9	-0.0	+6.9	+12.1	+14.5	+18.2	+24.0	+25.0	
7.0	720	-30.0			-14.8	-11.5	-8.7	-5.0	+0.3	+7.3	+13.1	+16.5	+19.2	+25.0	+26.0	
8.0	720	-26.0			-15.7	-12.5	-9.2	-5.2	+0.5	+8.6	+14.7	+17.9	+20.5	+28.0	+29.0	
9.0	720	-23.0			-14.9	-12.4	-9.7	-5.2	+1.3	+10.4	+17.6	+19.8	+23.9	+31.5	+32.0	
10.0	720	-22.0			-17.3	-13.8	-10.5	-5.6	+2.3	+12.4	+19.2	+23.5	+27.4	+33.0	+34.0	
11.0	720	-25.0			-20.1	-15.3	-12.2	-6.4	+3.5	+13.9	+20.7	+25.7	+29.6	+35.0	+36.0	
12.0	720	-24.0			-20.5	-15.9	-12.7	-6.0	+4.5	+15.4	+23.0	+27.1	+29.9	+38.0	+39.0	
13.0	720	-27.0			-19.2	-17.1	-13.6	-6.7	+4.6	+15.8	+23.3	+27.8	+31.2	+40.0	+41.0	
14.0	720	-23.0			-19.9	-16.8	-14.2	-7.2	+3.2	+14.2	+20.7	+23.3	+25.7	+31.0	+32.0	
15.0	720	-24.0			-19.2	-15.6	-12.5	-7.3	+1.2	+9.9	+15.1	+17.4	+18.5	+21.0	+22.0	
16.0	720	-23.0			-16.9	-14.3	-11.1	-7.3	-0.7	+5.2	+10.5	+12.3	+13.9	+21.0	+22.0	
17.0	720	-18.0			-15.8	-12.9	-10.8	-7.4	-2.1	+2.3	+4.3	+8.2	+9.6	+13.5	+14.0	
18.0	720	-20.0			-14.3	-12.9	-11.2	-8.6	-3.8	-0.1	+3.0	+4.7	+5.9	+9.0	+10.0	
19.0	720	-20.0			-14.9	-13.5	-12.4	-10.1	-5.8	-1.9	+0.1	+1.4	+2.5	+5.6	+6.0	
20.0	720	-22.0			-17.5	-15.8	-14.5	-11.7	-7.6	-3.8	-1.3	-0.3	+0.2	+2.6	+3.0	
21.0	720	-22.0			-17.7	-16.6	-15.1	-12.7	-9.3	-5.5	-3.4	-2.1	-1.2	-0.1	+0.0	
22.0	720	-24.0			-19.4	-17.7	-16.1	-13.8	-10.4	-7.0	-4.5	-3.3	-2.4	-0.9	+0.0	
23.0	720	-24.0			-19.8	-18.7	-17.3	-14.8	-11.4	-7.7	-5.5	-4.3	-3.0	-0.2	+0.0	
24.0	720	-26.0			-21.5	-19.6	-17.9	-15.6	-11.7	-8.1	-5.9	-4.2	-2.3	+0.5	+1.0	
25.0	720	-23.0			-21.9	-21.1	-19.6	-16.7	-12.4	-8.5	-5.4	-4.2	-3.0	+1.0	+2.0	
26.0	720	-29.0			-23.5	-21.9	-20.6	-17.2	-12.7	-8.1	-5.4	-3.9	-2.7	+0.0	+1.0	
27.0	720	-29.0			-24.2	-22.6	-21.4	-17.7	-12.7	-7.8	-5.2	-3.7	-2.0	+3.0	+4.0	
28.0	104	-24.7			-22.0	-21.4	-20.4	-17.1	-12.0	-6.9	-4.1	-2.6	0.0	0.4	0.4	
29.0	107	-26.2			-24.0	-23.4	-21.3	-17.8	-12.7	-7.3	-3.9	-2.6	-1.1	0.1	0.3	
30.0	104	-25.9			-23.0	-21.4	-20.3	-16.8	-11.8	-7.2	-3.3	-0.7	0.0	1.0	2.0	
31.0	104	-29.9			-24.0	-23.1	-21.3	-16.0	-11.4	-6.7	-1.4	0.0	2.0	4.2	4.4	
32.0	104	-29.4			-23.0	-22.1	-19.4	-15.7	-10.7	-5.4	-1.2	1.4	3.0	4.7	4.4	
33.0	104	-21.3			-19.0	-19.3	-16.7	-10.3	-6.5	1.4	4.4	6.0	6.0	6.5	6.5	
34.0	104	-21.5			-20.0	-20.5	-19.2	-16.1	-10.2	-5.1	3.5	6.4	8.0	8.4	8.9	
35.0	104	-20.8			-26.0	-22.5	-20.3	-15.3	-9.2	-1.4	4.4	6.4	7.0	11.0	12.1	
36.0	104	-24.5			-26.5	-21.5	-18.4	-16.1	-9.2	-1.5	3.5	4.0	6.0	7.0	8.1	
37.0	107	-24.9			-24.0	-22.4	-19.0	-15.0	-8.7	-0.5	3.2	5.4	7.0	7.8	7.4	
38.0	104	-24.6			-24.6	-23.4	-22.4	-16.7	-9.7	-1.4	4.2	5.4	6.0	7.2	7.4	
39.0	104	-25.3			-23.0	-22.4	-22.4	-17.5	-10.6	-1.4	3.0	6.4	8.4	9.1	9.2	
40.0	104	-27.0			-26.0	-25.4	-23.1	-19.0	-9.7	-2.2	1.4	4.4	6.4	7.2	7.2	
41.0	102	-30.9			-30.0	-28.7	-27.1	-20.1	-9.2	-0.0	2.0	6.7	9.6	10.1	10.2	
42.0	102	-30.5			-33.0	-29.4	-25.0	-21.2	-8.8	-1.1	1.7	3.4	4.0	9.4	9.7	
43.0	100	-30.5			-40.0	-32.7	-29.5	-24.1	-8.4	-0.7	3.0	5.7	7.0	10.4	10.7	
44.0	94	-41.1			-37.7	-30.1	-19.4	-8.4	-0.7	3.4	5.0	6.0	6.0	6.0	7.1	
45.0	95	-34.0			-28.0	-27.2	-17.0	-6.8	0.3	4.3	5.4	10.1	11.3	11.4		
46.0	94	-32.6			-25.0	-24.3	-16.2	-7.2	1.4	5.3	6.0	14.1	19.2	19.4		
47.0	84	-30.2			-27.0	-24.6	-15.3	-7.3	1.3	4.4	13.4	14.2	15.2	15.4		
48.0	84	-24.7			-24.1	-22.7	-16.5	-5.0	2.0	7.4	12.1	14.2	15.0	15.1		
49.0	83	-26.8			-22.4	-22.4	-16.2	-5.4	4.4	4.4	11.1	15.1	15.6	15.6		
50.0	81	-26.4			-23.2	-20.7	-15.5	-3.7	7.1	12.7	18.2	19.2	19.8	19.9		
51.0	74	-27.5			-26.5	-24.7	-17.5	-2.5	7.5	12.7	18.4	22.4	23.0	23.1		
52.0	66	-29.8			-25.8	-23.9	-16.3	0.3	4.0	15.0	17.0	23.2	23.5	23.5		
53.0	61	-30.6			-24.7	-21.1	-14.3	2.4	11.9	19.1	19.8	28.4	29.0	29.1		
54.0	54	-24.1			-10.0	-17.7	-9.7	4.0	12.9	18.9	20.0	21.6	21.4	21.9		
55.0	44	-19.8				-14.1	-10.1	4.3	14.5	23.1	23.4	23.0	24.0	24.0		
56.0	31	-14.2				-13.4	-7.0	11.3	20.1	26.5	29.6	29.4	30.1	30.2		
59.0	20	-14.9				-14.0	-6.4	10.3	20.9	23.0	29.0	29.7	29.4	29.4		
60.0	12	-13.2					-12.1	4.0	33.1	36.3	36.4	36.7	36.4	36.4		
61.0	4	-17.5					-13.7	5.0	24.7	44.7	45.0	45.1	45.2	45.2		
62.0	4	-24.0						-14.0	45.0	45.6	45.7	45.4	45.9	45.9		
63.0	4	-26.5						-20.0	53.0	63.7	63.0	63.0	64.0	64.0		
64.0	2	-11.9						-12.0	1.4	1.4	1.4	1.4	1.4	1.4		
65.0	1	27.3													22.3	
66.0	1	24.2													28.2	
67.0	1	17.0													17.0	
68.0	1	10.0													10.0	
69.0	1	4.7													4.7	
70.0	1	1.5													1.5	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.10

DATA SOURCE											OCTOBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 744	-14.0	-13.9	-9.5	-8.1	-6.9	-4.1	-1.0	+0.8	+1.9	+3.3	+4.1	+6.9	+13.0			
1.0 744	-18.0	-17.9	-14.5	-13.3	-11.4	-7.7	-1.9	+3.1	+7.1	+10.2	+11.9	+18.9	+20.0			
2.0 744	-18.0	-15.9	-13.6	-11.0	-9.2	-5.3	-0.1	+5.8	+9.9	+13.0	+15.6	+22.4	+23.0			
3.0 744	-18.0	-16.9	-12.2	-9.8	-6.7	-3.4	+1.2	+7.5	+12.6	+16.0	+17.2	+25.9	+27.0			
4.0 744	-15.0	-14.9	-9.9	-7.5	-5.2	-2.0	+2.8	+9.2	+14.5	+19.0	+23.5	+28.9	+33.0			
5.0 744	-17.0	-15.9	-8.3	-6.3	-4.5	-1.5	+4.5	+11.6	+17.1	+21.5	+25.7	+33.9	+36.0			
6.0 744	-13.0	-11.9	-8.3	-6.6	-4.1	-0.5	+6.2	+13.6	+20.6	+24.0	+28.2	+38.9	+49.0			
7.0 744	-11.0	-9.9	-9.1	-6.5	-3.8	-0.1	+8.1	+16.9	+24.6	+27.0	+32.5	+44.9	+61.0			
8.0 744	-12.0	-11.9	-8.5	-5.8	-2.9	+0.8	+10.1	+20.0	+28.7	+34.0	+38.6	+50.9	+65.0			
9.0 744	-12.0	-11.9	-7.3	-5.2	-2.9	+1.8	+12.1	+24.0	+33.5	+40.6	+43.5	+55.9	+81.0			
10.0 744	-16.0	-12.9	-9.6	-6.2	-2.5	+2.5	+14.8	+27.6	+37.9	+44.3	+49.2	+65.9	+79.0			
11.0 744	-18.0	-14.9	-8.8	-6.0	-2.9	+3.2	+17.2	+31.9	+42.1	+48.6	+50.5	+72.9	+75.0			
12.0 744	-16.0	-9.9	-7.8	-6.1	-1.9	+4.0	+18.6	+34.4	+42.9	+47.0	+51.5	+68.9	+76.0			
13.0 744	-9.0	-8.9	-7.4	-5.4	-2.3	+3.9	+18.4	+34.4	+41.9	+46.0	+48.6	+52.9	+66.0			
14.0 744	-9.0	-8.9	-6.3	-5.1	-2.4	+3.6	+17.1	+29.9	+37.8	+40.8	+46.5	+48.6	+58.0			
15.0 744	-9.0	-8.9	-5.3	-3.8	-1.9	+3.0	+13.8	+23.8	+30.8	+36.0	+38.7	+49.9	+54.0			
16.0 744	-8.0	-8.9	-5.9	-4.1	-2.2	+1.1	+9.3	+18.0	+24.3	+28.2	+32.5	+39.9	+41.0			
17.0 744	-10.0	-8.9	-7.0	-5.4	-3.6	-0.6	+6.7	+12.0	+18.4	+23.2	+27.1	+29.7	+30.0			
18.0 744	-9.0	-8.9	-7.5	-6.5	-5.2	+0.9	+6.7	+11.8	+16.0	+20.9	+25.9	+30.0	+30.0			
19.0 744	-12.0	-11.9	-9.1	-8.1	-6.9	-4.5	-0.8	+3.2	+7.6	+11.0	+13.2	+23.9	+30.0			
20.0 744	-13.0	-11.9	-10.0	-9.0	-8.1	-6.1	-2.1	+1.1	+5.1	+7.6	+10.8	+18.9	+23.0			
21.0 744	-14.0	-13.9	-10.8	-9.8	-8.8	-6.8	-3.0	+0.2	+3.8	+5.8	+7.6	+15.9	+17.0			
22.0 744	-14.0	-13.9	-11.8	-10.7	-9.6	-7.4	-3.5	-0.2	+2.7	+4.8	+7.1	+9.9	+11.0			
23.0 744	-17.0	-14.9	-13.4	-12.0	-10.7	-8.9	-4.0	-0.1	+2.7	+5.0	+7.1	+8.9	+11.0			
24.0 744	-15.0	-13.2	-11.8	-10.8	-8.4	-3.8	-0.0	+3.0	+5.6	+7.6	+10.9	+12.0	+13.0			
25.0 744	-15.0	-12.8	-12.2	-11.1	-8.1	-3.5	+0.5	+4.5	+6.8	+8.8	+10.9	+13.0	+13.0			
26.0 744	-16.0	-14.6	-13.0	-11.9	-7.9	-2.7	+1.9	+5.8	+8.6	+10.8	+12.9	+14.0	+14.0			
27.0 744	-17.0	-14.9	-13.6	-11.6	-7.4	-2.2	+3.6	+7.8	+10.1	+12.1	+14.9	+16.0	+16.0			
28.0 74	-14.5	-14.2	-12.1	-11.1	-7.8	-1.0	+7.5	+11.0	+12.1	+13.2	+13.0	+14.0	+14.0			
29.0 89	-16.2	-13.1	-12.2	-11.2	-8.2	-5.6	-2.5	+10.7	+17.0	+20.1	+21.2	+21.0	+22.0			
30.0 84	-12.7	-10.5	-9.7	-8.7	-5.0	-1.0	+4.0	+13.4	+14.6	+20.2	+20.4	+20.9	+20.9			
31.0 85	-14.4	-12.0	-9.7	-8.2	-5.2	-5.0	-1.0	+12.0	+20.3	+22.0	+25.1	+26.0	+26.1			
32.0 90	-10.6	-9.5	-7.6	-6.0	-3.4	-1.0	+16.0	+22.5	+25.0	+32.1	+32.0	+33.0	+33.0			
33.0 90	-10.1	-6.7	-5.5	-3.6	-2.6	-1.0	+10.5	+22.0	+26.4	+34.0	+34.1	+34.1	+34.2			
34.0 90	-0.7	-7.0	-6.6	-5.2	-3.7	-1.0	+10.3	+21.0	+24.5	+31.5	+31.5	+31.5	+31.5			
35.0 90	-10.4	-10.5	-10.5	-9.7	-8.4	-5.0	-1.1	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0			
36.0 91	-15.1	-10.0	-9.0	-7.4	-5.1	-1.1	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
37.0 90	-14.9	-10.0	-9.0	-7.4	-5.1	-1.1	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
38.0 89	-17.7	-10.0	-9.0	-7.4	-5.1	-1.1	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
39.0 94	-11.6	-8.0	-7.1	-5.1	-3.4	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
40.0 95	-9.6	-7.9	-6.4	-4.0	-1.6	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
41.0 96	-10.2	-5.0	-4.7	-1.4	-1.4	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
42.0 97	-10.5	-4.6	-5.1	-4.2	-1.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
43.0 97	-11.4	-4.6	-6.1	-5.1	-2.2	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
44.0 94	-13.3	-7.0	-4.3	-4.0	-2.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
45.0 92	-11.2	-5.0	-4.1	-5.4	-2.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
46.0 93	-14.9	-7.0	-1.4	-1.4	-1.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
47.0 91	-14.3	-6.0	-0.5	-0.5	-1.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
48.0 89	-5.5	-1.0	-3.5	-1.0	-1.0	-1.0	+11.5	+27.0	+35.0	+35.0	+35.0	+35.0	+35.0			
49.0 86	-0.9	0.0	5.0	10.4	33.4	51.4	64.7	78.0	85.2	85.2	85.2	85.2	85.2			
50.0 84	2.3	2.0	4.2	15.7	35.7	54.7	70.4	77.1	82.1	82.1	82.1	82.1	82.1			
51.0 79	1.7	2.4	4.5	14.6	37.1	56.5	74.1	81.1	83.0	83.0	83.0	83.0	83.0			
52.0 75	1.9	2.4	3.4	17.4	30.2	50.1	75.1	84.1	85.1	85.1	85.1	85.1	85.1			
53.0 70	3.3	5.5	18.1	41.5	59.0	76.5	82.1	82.0	82.0	82.0	82.0	82.0	82.0			
54.0 63	3.8	5.2	7.2	18.5	42.5	61.0	73.0	74.0	74.0	74.0	74.0	74.0	74.0			
55.0 57	3.2	4.1	8.4	21.0	42.3	60.0	74.2	80.7	81.2	81.2	81.2	81.2	81.2			
56.0 44	3.5	10.4	17.3	42.3	59.7	74.1	79.0	79.0	79.0	79.0	79.0	79.0	79.0			
57.0 40	4.6	7.0	19.3	45.0	60.3	75.5	81.1	81.1	81.1	81.1	81.1	81.1	81.1			
58.0 34	4.5	10.4	41.0	60.5	71.7	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1			
59.0 27	-1.5	6.4	13.1	43.5	62.7	70.7	77.1	77.1	77.1	77.1	77.1	77.1	77.1			
60.0 22	-4.6	1.1	9.5	44.0	65.5	69.0	82.7	83.1	83.1	83.1	83.1	83.1	83.1			
61.0 14	0.0	25.2	47.0	67.4	87.4	87.0	87.0	87.0	87.0	87.0	87.0	87.0	87.0			
62.0 4	27.6	40.0	69.5	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0			
63.0 2	34.6	35.0	84.4	85.1	85.1	85.1	85.1	85.1	85.1	85.1	85.1	85.1	85.1			
64.0 1	36.9															
65.0 1	44.4															
66.0 1	24.2															
67.0 1	14.6															
68.0 1	5.0															
69.0 1	4.3															
70.0 1	23.0															

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-9.0			-7.3	-4.2	-5.3	-2.9	-0.6	+1.2	+3.0	+3.8	+4.8	+9.0	+10.0	
1.0	720	-18.0			-13.7	-11.6	-9.0	-7.3	-1.4	+5.4	+10.5	+13.1	+15.9	+22.0	+23.0	
2.0	720	-20.0			-11.8	-10.3	-8.0	-4.8	+0.6	+8.1	+14.6	+17.8	+22.6	+29.0	+30.0	
3.0	720	-19.0			-10.3	-7.9	-5.7	-2.2	+2.6	+11.0	+17.9	+21.4	+24.8	+34.5	+35.0	
4.0	720	-11.0			-9.3	-7.9	-4.7	-0.7	+4.7	+13.2	+20.8	+24.0	+28.4	+36.0	+37.0	
5.0	720	-13.0			-8.6	-6.6	-3.7	-0.0	+7.8	+16.5	+24.5	+28.1	+32.4	+41.0	+42.0	
6.0	720	-12.0			-8.5	-6.2	-3.2	+2.0	+10.0	+20.3	+28.4	+32.4	+37.8	+49.0	+50.0	
7.0	720	-13.0			-7.5	-5.2	-2.0	+3.3	+13.5	+23.2	+33.0	+36.8	+40.4	+48.0	+49.0	
8.0	720	-19.0			-9.8	-4.8	-1.5	+5.3	+16.2	+26.7	+37.7	+41.7	+47.4	+56.0	+57.0	
9.0	720	-19.0			-10.2	-3.5	-1.1	+7.5	+19.2	+30.7	+41.2	+47.1	+52.8	+80.0	+81.0	
10.0	720	-24.0			-11.5	-5.3	-0.7	+8.9	+22.3	+38.7	+49.0	+54.1	+61.8	+92.0	+93.0	
11.0	720	-23.0			-9.7	-5.6	-0.0	+11.4	+24.4	+38.1	+48.0	+57.6	+66.8	+89.0	+90.0	
12.0	720	-16.0			-10.8	-5.9	+0.3	+12.2	+27.2	+40.7	+50.0	+59.5	+66.8	+96.0	+97.0	
13.0	720	-16.0			-11.3	-2.8	+3.0	+12.6	+27.5	+39.8	+49.0	+58.5	+62.9	+92.0	+93.0	
14.0	720	-15.0			-7.7	-0.9	+4.7	+11.8	+25.0	+37.3	+44.0	+49.2	+57.9	+72.0	+73.0	
15.0	720	-18.0			-5.9	+1.5	+3.8	+11.3	+22.2	+30.8	+37.1	+41.7	+44.8	+56.0	+57.0	
16.0	720	-13.0			-3.7	-1.2	+1.7	+8.1	+17.8	+25.1	+30.7	+34.6	+36.7	+51.0	+52.0	
17.0	720	-7.0			-4.8	-2.2	+0.2	+4.9	+12.5	+19.5	+24.8	+27.5	+30.4	+38.0	+39.0	
18.0	720	-9.0			-6.9	-4.9	-2.4	+1.3	+8.1	+14.1	+18.8	+21.3	+24.2	+29.0	+30.0	
19.0	720	-11.0			-7.9	-5.4	-3.3	+0.4	+4.6	+9.7	+14.1	+17.2	+20.8	+29.0	+30.0	
20.0	720	-9.0			-7.5	-6.1	-4.5	-1.2	+2.5	+7.4	+12.5	+15.1	+19.2	+24.5	+25.0	
21.0	720	-14.0			-7.9	-6.9	-5.4	-2.0	+1.6	+6.8	+11.3	+14.1	+19.4	+27.0	+28.0	
22.0	720	-13.0			-9.1	-7.2	-5.9	-2.3	+1.7	+7.2	+11.7	+16.3	+18.6	+28.0	+29.0	
23.0	720	-15.0			-9.7	-7.9	-6.3	-2.0	+2.6	+7.9	+13.3	+16.7	+19.8	+28.0	+29.0	
24.0	720	-21.0			-10.5	-9.1	-6.5	-1.6	+4.0	+9.8	+14.5	+17.1	+18.9	+24.0	+25.0	
25.0	720	-19.0			-11.3	-8.5	-7.1	-1.3	+5.7	+12.1	+16.6	+19.3	+21.8	+32.0	+33.0	
26.0	720	-19.0			-11.8	-10.2	-6.5	-0.6	+7.3	+14.1	+18.4	+21.0	+23.8	+31.0	+32.0	
27.0	720	-23.0			-13.7	-10.4	-6.3	-0.0	+9.3	+16.7	+20.9	+22.5	+24.9	+32.0	+33.0	
28.0	84	-13.0			-6.5	-2.5	2.4	11.8	20.4	24.0	27.4	28.0	29.4	34.0	34.0	
29.0	90	-11.6			-8.0	-4.5	4.5	15.5	24.2	28.0	31.0	33.1	34.2	36.3	36.3	
30.0	90	-10.0			-8.0	-4.5	5.1	17.8	26.7	32.0	35.0	37.7	38.2	39.0	39.0	
31.0	91	-16.0			-6.0	-0.7	7.8	19.5	28.8	35.2	38.0	39.1	38.8	39.0	39.0	
32.0	91	-9.9			0.1	1.5	10.5	22.4	32.9	37.5	40.5	41.1	42.0	42.1	42.1	
33.0	92	-16.4			-0.0	1.8	18.8	25.0	36.1	42.7	44.7	44.1	44.3	44.4	44.4	
34.0	92	-21.0			1.1	2.8	17.1	27.7	39.8	42.8	46.5	48.1	48.9	49.0	49.0	
35.0	92	-21.4			3.1	6.4	15.0	30.0	40.2	48.2	51.5	52.1	52.1	52.1	52.1	
36.0	90	-23.4			6.0	10.2	18.4	30.8	41.0	49.5	54.0	54.8	55.3	55.4	55.4	
37.0	91	-25.3			8.0	9.6	10.2	32.3	45.5	52.5	55.0	60.1	60.8	60.9	60.9	
38.0	94	-20.8			4.2	13.4	20.4	35.0	48.5	54.1	57.8	65.1	65.9	66.1	66.1	
39.0	94	-6.6			5.1	15.4	22.5	38.8	51.8	55.3	59.0	67.1	69.1	69.1	69.1	
40.0	94	-7.6			13.1	16.7	25.8	41.5	53.8	59.7	61.0	69.1	70.1	70.1	70.1	
41.0	94	0.8			14.1	16.8	25.8	41.5	53.8	59.7	61.0	70.1	71.1	71.1	71.1	
42.0	94	0.4			15.1	18.7	30.8	45.0	58.5	65.7	67.0	71.1	71.1	71.1	71.1	
43.0	92	1.4			15.1	19.6	31.0	48.0	63.2	70.2	72.0	73.0	73.0	73.4	73.4	
44.0	84	12.7			18.5	22.4	35.0	51.7	69.5	73.5	83.4	83.4	83.7	83.8	83.8	
45.0	87	12.2			15.0	28.4	39.4	57.8	73.2	80.7	91.0	92.2	93.3	93.4	93.4	
46.0	86	7.1			19.0	28.3	42.2	59.0	79.1	88.7	97.0	99.2	100.0	100.1	100.1	
47.0	83	4.2			22.0	30.2	45.2	66.2	81.7	92.0	100.1	102.2	102.2	102.2	102.2	
48.0	82	4.9			21.0	35.1	46.0	71.0	87.7	94.0	100.1	102.1	102.5	102.5	102.5	
49.0	85	8.3			22.0	37.4	46.4	71.5	90.4	97.8	103.1	104.1	104.7	104.8	104.8	
50.0	84	0.8			26.0	33.2	51.2	74.0	92.7	99.8	104.5	117.1	117.4	117.5	117.5	
51.0	77	10.3			23.4	30.0	50.1	74.3	92.0	100.7	105.2	109.1	110.3	110.4	110.4	
52.0	74	9.1			23.7	29.7	51.7	74.0	91.1	102.1	106.1	109.4	110.3	110.4	110.4	
53.0	70	5.9			23.6	31.3	55.1	75.0	92.0	104.4	109.7	113.4	114.2	114.3	114.3	
54.0	61	3.3			28.4	35.1	56.7	77.5	97.2	109.0	111.0	117.2	117.5	117.5	117.5	
55.0	52	3.0			29.2	33.3	56.6	77.0	95.7	105.7	106.0	113.1	113.6	113.6	113.6	
56.0	47	4.5			27.1	30.2	56.5	76.8	90.5	106.4	107.0	110.3	110.5	110.5	110.5	
57.0	45	4.6			23.0	29.1	57.1	77.8	98.4	107.4	104.0	115.7	116.1	116.2	116.2	
58.0	38	25.1				26.9	55.0	75.0	95.0	104.1	121.0	121.0	122.4	122.4	122.4	
59.0	29	26.0				39.5	62.4	80.5	98.4	106.5	107.0	107.4	107.5	107.5	107.5	
60.0	21	39.0				40.1	69.3	78.8	90.7	109.0	112.0	113.2	113.4	113.4	113.4	
61.0	16	39.3					56.5	75.7	91.5	119.2	119.0	119.4	119.7	119.8	119.8	
62.0	15	39.7					61.0	77.5	85.4	124.1	124.7	124.0	125.0	125.0	125.0	
63.0	11	32.4					55.7	71.5	92.3	96.3	96.4	96.7	96.8	96.8	96.8	
64.0	7	51.2					52.1	68.5	84.0	115.7	115.0	115.0	115.0	115.0	115.0	
65.0	6	48.1						62.0	81.1	82.0	82.0	82.1	82.4	82.4	82.4	
66.0	4	39.9						53.0	71.3	71.5	71.6	71.7	71.7	71.7	71.7	
67.0	4	22.9						38.0	62.3	62.7	62.8	62.9	62.9	62.9	62.9	
68.0	4	11.9						30.0	92.3	92.7	92.8	92.8	92.8	92.8	92.8	
69.0	3	12.6						31.5	68.5	69.7	69.8	69.8	69.8	69.8	69.8	
70.0	2	-32.1						-32.0	90.4	90.7	90.8	90.8	90.8	90.8	90.8	

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

HEAD AND TAIL WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 8.12

DATA SOURCE										DECEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM DBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-9.0	-8.9	-6.9	-5.4	-3.8	-2.1	-0.3	+1.5	+3.3	+4.2	+5.6	+9.4	+10.0		
1.0	744	-19.0	-15.9	-11.9	-10.9	-9.2	-5.8	-0.0	+6.9	+11.9	+14.0	+16.1	+17.9	+19.0		
2.0	744	-15.0	-13.9	-9.7	-8.0	-6.1	-2.4	+3.0	+10.4	+14.7	+18.9	+22.7	+29.9	+35.0		
3.0	744	-12.0	-9.9	-5.9	-4.8	-3.3	-0.5	+6.1	+13.9	+20.7	+23.8	+26.2	+34.9	+34.0		
4.0	744	-8.0	-7.9	-4.5	-3.2	-1.1	+1.4	+9.4	+18.0	+25.5	+28.2	+34.3	+38.9	+41.0		
5.0	744	-14.0	-8.9	-3.6	-2.3	-0.5	+3.3	+12.3	+21.9	+29.5	+33.5	+37.5	+45.9	+51.0		
6.0	744	-14.0	-6.9	-3.5	-1.5	+0.7	+5.5	+15.9	+25.7	+32.8	+38.6	+42.5	+49.9	+54.0		
7.0	744	-14.0	-11.9	-3.8	-0.7	+2.1	+7.0	+18.8	+29.6	+38.5	+43.0	+48.5	+54.9	+67.0		
8.0	744	-15.0	-10.9	-3.7	-0.6	+2.6	+8.9	+21.8	+35.3	+43.7	+50.0	+58.2	+60.9	+68.0		
9.0	744	-24.0	-18.9	-3.5	-0.4	+2.6	+10.2	+25.4	+40.1	+49.6	+58.0	+60.8	+69.9	+71.0		
10.0	744	-20.0	-19.9	-3.2	-0.3	+4.0	+11.8	+29.0	+44.0	+55.4	+63.2	+68.5	+75.9	+81.0		
11.0	744	-16.0	-14.9	-3.5	+0.5	+4.6	+13.4	+31.4	+47.7	+57.7	+64.0	+70.5	+84.9	+89.0		
12.0	744	-11.0	-6.9	-1.7	+2.7	+7.2	+16.4	+34.0	+50.1	+60.9	+68.6	+73.5	+98.9	+100.0		
13.0	744	-2.0		+0.4	+5.7	+9.7	+18.2	+34.3	+49.0	+60.2	+65.0	+72.5	+79.9	+95.0		
14.0	744	+0.0	+0.0	+4.7	+7.3	+11.0	+17.9	+32.7	+46.0	+56.9	+62.5	+72.5	+79.9	+83.0		
15.0	744	-6.0	-1.9	+2.4	+6.9	+10.5	+16.9	+29.0	+41.4	+49.2	+55.7	+63.5	+71.9	+75.0		
16.0	744	-2.0		+2.2	+5.5	+8.4	+14.4	+24.9	+34.4	+40.7	+46.7	+57.2	+61.9	+64.0		
17.0	744	-7.0	-3.9	-0.2	+1.8	+5.8	+10.8	+20.1	+27.9	+34.8	+39.6	+46.2	+54.9	+57.0		
18.0	744	-8.0	-4.9	-2.2	-0.2	+2.6	+7.4	+14.3	+22.7	+28.1	+31.7	+34.5	+40.6	+41.0		
19.0	744	-7.0	-6.9	-3.8	-1.0	+0.0	+3.1	+8.7	+17.4	+23.8	+24.6	+31.5	+34.9	+37.0		
20.0	744	-5.0	-3.9	-2.7	-1.1	+0.9	+5.9	+13.4	+20.5	+24.2	+29.7	+34.9	+37.0			
21.0	744	-8.0	-7.9	-6.6	-5.3	-2.7	-0.2	+5.3	+12.3	+17.6	+21.5	+29.2	+33.9	+35.0		
22.0	744	-10.0	-9.9	-8.3	-5.9	-3.5	-0.2	+5.4	+11.8	+17.2	+21.1	+23.1	+28.9	+31.0		
23.0	744	-11.0		-6.7	-4.3	+0.0	+6.6	+13.0	+18.6	+21.0	+27.1	+27.1	+29.9	+33.0		
24.0	744	-10.0		-7.3	-4.7	+1.0	+8.1	+15.9	+21.4	+25.4	+29.2	+34.6	+35.0			
25.0	744	-20.0	-16.9	-10.3	-7.7	-5.3	+2.5	+10.4	+18.7	+25.3	+28.0	+31.7	+37.9	+41.0		
26.0	744	-18.0	-16.9	-11.9	-9.0	-5.6	+3.2	+12.1	+20.4	+27.6	+31.0	+35.1	+37.9	+40.0		
27.0	744	-21.0		-14.8	-12.1	-6.9	+3.5	+13.7	+22.5	+27.9	+33.0	+35.6	+37.9	+43.0		
28.0	132	-24.9	-15.7	-14.0	-11.4	-4.0	+1.5	+16.5	+25.7	+30.7	+31.0	+32.7	+36.0	+36.2		
29.0	136	-27.6	-17.7	-15.0	-11.6	-3.0	+19.7	+26.5	+31.7	+34.0	+40.7	+46.5	+46.7			
30.0	139	-27.8	-17.6	-14.4	-12.5	-3.0	+21.4	+29.6	+35.4	+34.0	+42.4	+44.4	+44.4			
31.0	140	-27.0	-17.6	-15.4	-14.4	-1.7	+24.7	+32.3	+39.0	+41.0	+46.4	+44.4	+44.4			
32.0	141	-24.8	-17.4	-16.9	-15.0	-1.6	+26.5	+36.4	+41.4	+43.0	+51.6	+52.6	+52.6			
33.0	141	-31.0	-19.6	-16.0	-15.7	-1.4	+27.0	+39.5	+50.0	+53.4	+55.4	+55.7	+55.9			
34.0	141	-34.4	-24.6	-19.4	-15.6	-0.6	+27.2	+43.3	+55.0	+57.4	+62.4	+62.4	+67.1	+67.4		
35.0	141	-37.0	-27.4	-18.4	-15.6	-0.4	+25.9	+47.3	+60.0	+63.4	+64.4	+64.4	+64.4			
36.0	141	-34.8	-25.6	-18.4	-17.0	-0.5	+26.5	+49.2	+61.0	+64.4	+67.4	+67.4	+74.0	+74.2		
37.0	141	-41.5	-30.4	-21.0	-19.6	-0.6	+24.4	+50.2	+64.0	+67.4	+64.4	+64.4	+71.5	+71.6		
38.0	141	-42.4	-38.4	-24.4	-17.0	-0.2	+24.8	+54.5	+65.4	+71.4	+73.4	+73.4	+75.4	+75.6		
39.0	142	-41.5	-38.4	-26.4	-20.0	-0.4	+31.0	+55.5	+64.5	+72.4	+73.4	+74.4	+74.7	+74.8		
40.0	142	-47.0	-39.6	-26.4	-23.0	-0.7	+37.5	+56.4	+69.0	+72.4	+73.4	+73.7	+74.2	+74.3		
41.0	142	-52.8	-43.6	-26.4	-20.0	-0.5	+39.8	+60.1	+66.5	+74.4	+74.4	+75.4	+76.7	+76.9		
42.0	140	-54.7	-45.6	-26.4	-23.0	-0.2	+37.5	+59.9	+67.5	+74.4	+78.4	+80.0	+80.2			
43.0	139	-56.5	-43.6	-30.4	-23.0	-0.2	+35.5	+62.0	+67.1	+74.4	+79.4	+82.7	+82.9			
44.0	140	-44.9	-42.6	-32.4	-21.0	-0.4	+31.0	+61.6	+71.0	+75.4	+77.4	+84.1	+84.3			
45.0	134	-44.9	-35.4	-34.4	-19.1	-0.5	+30.0	+65.1	+74.1	+77.0	+80.4	+82.2	+82.5			
46.0	137	-44.0	-39.6	-25.0	-17.1	-0.1	+29.2	+64.4	+77.2	+81.4	+82.0	+82.4	+82.5			
47.0	134	-47.5	-40.6	-24.4	-15.1	-0.1	+29.0	+71.4	+82.1	+83.0	+86.4	+84.4	+89.0			
48.0	136	-43.6	-34.6	-20.0	-12.2	-1.7	+24.0	+71.7	+84.1	+87.0	+91.4	+92.4	+92.4			
49.0	130	-36.9	-34.7	-26.0	-12.5	-0.4	+25.7	+74.2	+85.4	+89.0	+92.7	+94.7	+94.4			
50.0	127	-31.9	-29.7	-21.1	-12.9	-0.4	+25.3	+74.5	+87.4	+90.4	+92.4	+92.4	+92.4			
51.0	122	-29.0	-27.4	-22.2	-17.9	-1.6	+27.0	+74.4	+90.0	+91.4	+92.4	+95.2	+95.5			
52.0	115	-30.4	-25.4	-24.4	-19.2	-1.4	+22.4	+74.0	+90.4	+94.4	+96.0	+107.7	+107.4			
53.0	110	-44.6	-27.0	-26.7	-17.7	-0.3	+23.0	+74.5	+84.4	+99.2	+100.0	+122.5	+122.5			
54.0	102	-33.7	-26.7	-19.0	-14.0	-0.1	+21.5	+74.4	+84.4	+101.7	+105.0	+132.1	+132.3			
55.0	92	-35.7	-27.0	-21.4	-17.4	-0.4	+24.0	+75.7	+96.4	+104.4	+114.1	+120.1	+120.3			
56.0	81	-27.9	-27.2	-17.0	-14.0	-0.0	+30.5	+74.1	+100.0	+114.0	+136.4	+137.2	+137.4			
57.0	67	-35.4	-29.5	-20.4	-14.0	-0.4	+29.5	+80.4	+101.7	+104.4	+114.0	+114.1	+114.2			
58.0	51	-34.8		-22.4	-20.4	-0.5	+22.4	+69.9	+94.5	+104.0	+110.4	+111.2	+111.3			
59.0	34	-35.1		-24.1	-24.1	-3.4	+27.4	+64.4	+89.1	+130.1	+130.7	+131.1	+131.2			
60.0	22	-24.9			-24.0	-0.5	+36.5	+61.5	+101.0	+149.4	+149.4	+149.0	+149.1			
61.0	15	-27.4				7.4	+36.5	+92.5	+114.1	+114.4	+114.5	+114.5	+114.6			
62.0	4	4.7				29.3	+44.0	+55.7	+131.3	+131.4	+131.5	+131.5	+131.5			
63.0	2	64.2					+64.0	+74.4	+74.4	+74.4	+74.4	+74.4	+74.4			
64.0	1	74.7														

Positive is wind from the tail (255°).
Negative is wind from the head (75°).

DATA SOURCE							ANNUAL							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY	99.000	99.865	MAX SPEED (DEG)			
SFC	8766	-14.0	-10.4	-7.6	-6.3	-4.9	-3.0	-0.7	+1.2	+3.2	+4.4	+6.1	+9.3	+13.0
1.0	8766	-23.0	-18.2	-12.2	-10.4	-8.7	-5.2	-0.2	+5.8	+11.0	+14.5	+17.1	+22.1	+25.0
2.0	8766	-25.0	-17.0	-10.9	-9.1	-6.9	-3.3	+1.4	+8.6	+15.2	+18.7	+22.2	+28.2	+35.0
3.0	8766	-24.0	-16.5	-9.6	-7.4	-5.5	-2.2	+2.8	+11.6	+19.1	+23.1	+26.6	+34.8	+40.0
4.0	8766	-25.0	-14.2	-8.9	-6.9	-4.9	-1.5	+4.1	+14.7	+23.2	+27.1	+31.7	+40.3	+50.0
5.0	8766	-28.0	-14.4	-8.4	-6.7	-4.8	-1.2	+5.5	+18.4	+27.4	+32.2	+36.7	+46.6	+63.0
6.0	8766	-30.0	-13.8	-9.3	-7.1	-4.9	-1.0	+7.0	+22.2	+31.9	+37.2	+41.9	+50.5	+67.0
7.0	8766	-30.0	-15.5	-9.9	-7.7	-5.4	-0.9	+8.6	+25.8	+36.8	+42.7	+48.3	+60.5	+79.0
8.0	8766	-26.0	-19.3	-10.9	-8.5	-6.0	-1.0	+10.5	+29.6	+47.8	+55.0	+61.1	+79.0	+98.0
9.0	8766	-24.0	-18.8	-12.7	-9.8	-6.8	-1.1	+12.4	+33.8	+56.4	+64.8	+61.1	+79.1	+98.0
10.0	8766	-24.0	-22.5	-14.7	-11.4	-8.1	-1.1	+14.2	+38.1	+51.9	+60.1	+67.4	+79.4	+95.0
11.0	8766	-32.0	-25.6	-16.9	-13.2	-9.2	-1.3	+16.5	+41.5	+56.2	+63.9	+72.0	+87.1	+97.0
12.0	8766	-35.0	-27.0	-19.2	-14.8	-10.3	-1.2	+18.8	+44.1	+58.0	+65.8	+73.4	+92.0	+104.0
13.0	8766	-35.0	-29.0	-20.3	-15.8	-11.3	-1.2	+20.0	+44.0	+57.3	+63.9	+71.9	+85.2	+98.0
14.0	8766	-33.0	-27.0	-19.0	-15.1	-10.8	-2.1	+19.3	+40.6	+53.0	+59.4	+65.5	+79.0	+87.0
15.0	8766	-30.0	-23.6	-15.9	-13.0	-9.8	-2.0	+16.6	+35.6	+45.6	+52.2	+57.5	+69.7	+79.0
16.0	8766	-23.0	-19.5	-13.9	-11.6	-9.0	-3.8	+12.3	+30.0	+38.9	+44.2	+48.8	+58.6	+68.0
17.0	8766	-21.0	-14.3	-12.7	-11.1	-9.3	-5.1	+8.0	+24.1	+32.2	+37.0	+41.5	+50.5	+62.0
18.0	8766	-21.0	-16.3	-13.3	-11.9	-10.4	-6.9	+3.8	+17.5	+25.0	+29.7	+33.7	+42.0	+50.0
19.0	8766	-24.0	-17.7	-15.2	-13.8	-12.3	-9.0	+0.1	+11.3	+18.5	+23.3	+27.8	+35.7	+51.0
20.0	8766	-31.0	-21.5	-18.6	-16.8	-14.8	-10.8	-1.3	+7.2	+13.7	+18.4	+22.5	+30.6	+41.0
21.0	8766	-37.0	-23.7	-20.1	-18.2	-16.4	-12.3	-2.9	+5.2	+11.1	+14.7	+18.9	+27.5	+36.0
22.0	8766	-38.0	-25.1	-21.0	-19.6	-17.7	-13.7	-3.8	+4.3	+10.1	+13.8	+17.8	+28.3	+34.0
23.0	8766	-38.0	-25.5	-22.1	-20.7	-19.0	-14.7	-4.6	+4.2	+10.5	+14.2	+18.6	+28.0	+38.0
24.0	8766	-38.0	-27.2	-23.6	-21.9	-20.0	-15.6	-4.8	+5.3	+11.8	+15.9	+19.7	+29.3	+41.0
25.0	8766	-41.0	-29.6	-24.9	-23.1	-21.0	-16.5	-4.8	+6.7	+14.0	+18.6	+22.9	+32.0	+41.0
26.0	8766	-35.0	-30.6	-26.1	-24.0	-21.9	-17.1	-4.5	+8.0	+16.7	+21.1	+26.1	+35.3	+50.0
27.0	8766	-40.0	-32.4	-27.7	-25.3	-22.8	-17.7	-4.2	+9.5	+18.9	+23.2	+27.6	+37.5	+52.0
28.0	1190	-31.4	-30.7	-27.0	-25.0	-23.6	-18.4	-3.7	11.3	22.2	26.4	30.4	35.1	36.4
29.0	1224	-32.3	-30.3	-28.1	-26.5	-24.5	-19.0	-3.3	15.4	25.0	28.4	30.4	40.3	46.7
30.0	1246	-34.9	-31.3	-28.0	-27.0	-24.9	-19.5	-2.8	18.4	28.4	32.0	35.4	42.3	48.0
31.0	1262	-41.7	-35.1	-30.2	-27.8	-24.0	-19.0	-1.5	22.1	30.3	35.6	38.4	46.3	48.4
32.0	1274	-40.0	-35.1	-30.6	-28.5	-25.4	-19.4	-0.3	25.1	33.7	38.0	41.4	51.3	52.4
33.0	1290	-47.8	-43.2	-31.4	-29.0	-26.3	-19.5	0.1	26.0	36.7	40.4	44.0	55.2	65.0
34.0	1316	-51.1	-50.2	-33.1	-30.7	-27.0	-20.7	0.3	27.5	39.0	43.7	48.0	62.6	67.4
35.0	1330	-63.7	-53.2	-37.3	-33.9	-29.1	-21.4	0.4	27.2	40.4	47.4	52.0	64.6	64.5
36.0	1333	-64.8	-57.6	-37.6	-32.7	-29.4	-22.7	0.1	27.6	42.5	49.0	54.0	67.2	74.2
37.0	1339	-73.4	-58.6	-37.7	-34.9	-31.3	-24.2	0.5	29.2	44.1	50.6	59.6	64.6	71.6
38.0	1346	-76.3	-58.2	-41.3	-37.0	-33.1	-26.3	0.5	30.1	46.1	53.7	63.2	73.6	75.6
39.0	1355	-67.8	-67.2	-41.8	-37.4	-34.1	-25.9	0.1	30.5	47.5	54.4	63.7	73.6	74.4
40.0	1357	-77.0	-65.2	-43.5	-39.7	-36.0	-27.2	-0.4	31.3	47.1	54.4	63.7	73.6	74.4
41.0	1357	-79.1	-68.2	-46.3	-41.0	-37.6	-28.1	-0.2	37.0	52.2	60.2	65.2	75.6	76.9
42.0	1343	-74.6	-63.2	-46.6	-43.7	-39.5	-31.0	-0.9	36.4	55.2	62.1	66.4	78.2	80.2
43.0	1333	-86.1	-62.2	-49.4	-45.4	-42.0	-33.4	0.0	37.6	58.2	63.7	69.5	79.2	82.9
44.0	1322	-87.2	-60.2	-51.6	-48.2	-44.6	-34.1	0.2	34.7	60.4	64.8	72.4	93.5	84.3
45.0	1305	-85.7	-50.2	-53.0	-49.4	-45.7	-34.9	0.4	41.0	63.8	70.2	76.7	91.2	93.4
46.0	1257	-85.0	-60.3	-55.1	-51.4	-46.9	-35.4	2.5	42.8	66.9	75.2	80.4	97.3	100.1
47.0	1261	-82.4	-65.3	-56.5	-52.3	-48.0	-36.4	2.4	44.4	69.4	74.7	85.1	100.3	103.0
48.0	1234	-76.0	-61.3	-56.5	-53.0	-48.4	-36.7	4.3	44.4	72.7	84.1	84.4	100.3	102.5
49.0	1214	-69.2	-61.4	-57.1	-54.1	-49.4	-35.3	5.5	47.5	74.5	86.2	92.4	103.4	104.8
50.0	1174	-61.0	-60.0	-54.6	-54.7	-49.4	-35.1	6.0	40.5	76.1	87.4	94.4	105.4	110.4
51.0	1131	-74.0	-72.5	-58.4	-55.2	-50.4	-35.4	6.1	40.1	76.4	88.4	96.4	105.4	110.4
52.0	1071	-85.6	-68.4	-60.0	-55.5	-50.9	-36.4	6.4	51.3	76.0	90.2	98.1	107.6	122.5
53.0	1011	-75.1	-68.4	-61.4	-59.0	-52.1	-37.4	6.4	52.4	78.1	88.0	99.7	113.6	122.5
54.0	924	-68.4	-61.0	-56.4	-51.9	-47.8	-37.4	6.4	53.0	78.4	87.0	101.7	117.7	132.3
55.0	840	-64.7	-65.0	-59.3	-55.8	-52.4	-38.0	7.4	58.6	80.0	94.4	99.4	113.0	120.3
56.0	743	-71.4	-68.0	-59.7	-57.5	-53.0	-38.4	7.4	56.0	80.0	92.1	103.4	119.0	137.4
57.0	640	-67.8	-61.5	-57.2	-53.2	-49.1	-39.1	7.2	54.4	82.5	94.4	106.4	120.1	120.5
58.0	515	-71.6	-62.4	-60.1	-55.1	-50.4	-39.4	9.3	56.1	79.8	94.4	105.3	139.4	140.3
59.0	393	-64.1	-65.0	-62.4	-55.7	-50.9	-39.1	10.1	59.2	84.5	94.1	106.1	130.5	131.2
60.0	273	-72.5	-69.3	-65.0	-59.3	-54.0	-42.0	10.1	57.4	87.4	90.0	108.3	148.7	149.1
61.0	158	-81.5	-80.1	-72.7	-64.6	-51.0	-43.3	8.3	61.2	87.4	90.0	108.3	148.7	149.1
62.0	124	-89.9	-79.8	-78.4	-66.2	-54.0	-45.0	2.2	62.4	92.4	96.2	124.4	131.4	131.5
63.0	75	-90.2	-80.3	-80.3	-71.5	-56.2	-45.0	1.5	64.2	84.4	91.0	115.5	116.0	116.0
64.0	44	-90.1	-85.0	-85.0	-71.5	-56.2	-45.0	1.5	64.2	84.4	91.0	115.5	116.0	116.0
65.0	36	-72.5	-71.1	-68.0	-60.5	-54.0	-45.0	2.5	56.4	67.5	71.2	71.4	71.7	71.7
66.0	29	-77.9	-61.7	-61.7	-54.0	-48.0	-45.0	2.5	60.0	62.4	116.4	116.6	116.7	116.7
67.0	25	-118.5	-61.5	-61.5	-54.0	-48.0	-45.0	2.5	60.0	62.4	116.4	116.6	116.7	116.7
68.0	24	-64.8	-61.5	-61.5	-54.0	-48.0	-45.0	2.5	60.0	62.4	116.4	116.6	116.7	116.7
69.0	24	-41.1	-39.7	-39.7	-39.7	-39.7	-39.7	2.5	60.0	62.4	116.4	116.6	116.7	116.7
70.0	25	-50.1	-37.7	-37.7	-37.7	-37.7	-37.7	2.5	60.0	62.4	116.4	116.6	116.7	116.7

Positive is wind from the tail (255°)
Negative is wind from the head (75°)

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH TABLE 9.1

DATA SOURCE							JANUARY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1957										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-11.0		-10.9	-9.1	-7.6	-6.6	-4.3	-1.2	+1.5	+3.6	+4.7	+6.6	+7.9	+9.0	
1.0	744	-18.0			-14.7	-12.6	-11.1	-6.4	-0.4	+5.2	+9.6	+12.0	+14.8	+19.9	+22.0	
2.0	744	-30.0		-27.9	-17.6	-14.5	-11.2	-7.1	-0.7	+4.3	+8.4	+10.2	+13.1	+16.6	+17.0	
3.0	744	-36.0		-32.9	-20.5	-17.5	-12.9	-8.1	-1.4	+4.5	+8.7	+11.6	+14.5	+20.9	+27.0	
4.0	744	-35.0			-23.7	-19.6	-13.8	-8.8	-1.8	+3.8	+9.2	+11.6	+15.8	+23.9	+33.0	
5.0	744	-38.0		-36.9	-29.2	-22.3	-15.7	-9.6	-2.3	+3.8	+9.2	+14.0	+17.8	+24.9	+32.0	
6.0	744	-44.0		-39.9	-30.7	-23.5	-18.1	-10.7	-2.6	+3.9	+10.7	+14.7	+19.2	+31.9	+36.0	
7.0	744	-43.0		-42.9	-31.7	-24.6	-21.2	-11.5	-3.0	+4.2	+11.9	+17.0	+20.2	+29.9	+40.0	
8.0	744	-46.0		-45.9	-35.5	-29.0	-22.4	-13.1	-3.5	+4.1	+13.9	+19.5	+24.7	+33.9	+37.0	
9.0	744	-53.0		-44.9	-35.9	-31.5	-24.4	-14.4	-4.4	+4.8	+14.7	+21.0	+25.7	+37.9	+40.0	
10.0	744	-44.0		-43.9	-37.8	-31.7	-24.9	-15.9	-5.0	+5.0	+13.6	+20.3	+28.6	+35.9	+41.0	
11.0	744	-50.0		-45.9	-41.1	-34.4	-28.1	-17.8	-5.9	+4.9	+16.1	+22.0	+25.7	+37.4	+38.0	
12.0	744	-51.0			-41.5	-34.7	-28.9	-18.2	-5.8	+4.6	+13.9	+20.0	+27.5	+37.9	+41.0	
13.0	744	-48.0		-44.9	-36.5	-30.5	-25.9	-16.8	-6.6	+3.3	+11.9	+16.6	+20.1	+31.9	+38.0	
14.0	744	-40.0		-33.9	-31.1	-28.0	-22.2	-16.3	-7.0	+2.2	+8.7	+14.0	+17.2	+28.9	+34.0	
15.0	744	-35.0		-34.9	-28.8	-25.1	-20.7	-14.6	-5.3	+2.1	+7.6	+12.7	+17.2	+24.9	+26.0	
16.0	744	-32.0		-28.9	-24.5	-20.7	-18.0	-11.8	-4.5	+2.0	+6.2	+9.6	+12.5	+21.4	+22.0	
17.0	744	-27.0		-25.9	-21.1	-18.2	-15.4	-10.7	-4.0	+1.9	+5.9	+7.8	+10.2	+19.4	+20.0	
18.0	744	-21.0			-16.5	-14.0	-12.1	-8.5	-2.8	+1.5	+4.6	+6.6	+8.8	+10.9	+12.0	
19.0	744	-20.0		-18.9	-12.8	-11.7	-9.4	-6.3	-1.9	+1.0	+3.8	+5.4	+7.0	+9.4	+10.0	
20.0	744	-16.0		-15.9	-11.9	-9.7	-7.2	-4.9	-1.5	+0.9	+3.2	+4.5	+5.7	+9.9	+12.0	
21.0	744	-20.0		-18.9	-11.2	-8.8	-7.1	-4.5	-1.0	+0.8	+2.7	+4.2	+7.7	+11.9	+14.0	
22.0	744	-17.0		-14.9	-9.5	-8.2	-6.7	-4.0	-0.9	+1.6	+4.4	+5.6	+7.7	+11.9	+14.0	
23.0	744	-13.0			-9.1	-7.9	-6.4	-3.8	-0.6	+2.2	+5.1	+6.3	+8.7	+14.9	+27.0	
24.0	744	-11.0		-10.9	-8.7	-7.7	-6.5	-4.0	-0.6	+2.7	+5.6	+6.9	+9.5	+13.9	+19.0	
25.0	744	-15.0			-9.9	-8.3	-7.2	-4.4	-0.7	+2.9	+6.0	+7.6	+10.1	+15.9	+20.0	
26.0	744	-14.0		-12.9	-10.6	-9.3	-7.9	-4.7	-1.0	+3.3	+7.1	+9.5	+11.6	+18.9	+20.0	
27.0	744	-14.0			-11.1	-9.5	-8.2	-4.9	-0.7	+4.4	+9.3	+12.1	+14.5	+26.4	+27.0	
28.0	105	-12.1			-11.0	-10.4	-6.9	-4.6	0.5	7.6	12.4	16.4	19.0	19.7	19.4	
29.0	107	-24.4			-15.0	-14.4	-10.5	-3.0	0.5	4.1	14.7	17.4	18.0	20.4	21.0	
30.0	104	-22.2			-14.0	-11.4	-9.6	-5.1	-0.1	10.2	16.4	19.4	21.9	22.9	23.0	
31.0	109	-15.4			-13.0	-12.4	-10.6	-5.0	0.4	10.5	19.2	23.5	24.0	27.5	27.6	
32.0	113	-17.7			-13.0	-11.4	-10.3	-6.7	0.4	13.1	19.7	23.0	24.0	27.1	27.2	
33.0	115	-17.7			-16.0	-13.4	-12.3	-9.2	-1.5	13.3	21.4	23.0	23.4	28.2	24.4	
34.0	117	-20.1			-14.4	-15.3	-14.4	-10.4	-2.4	12.4	20.4	25.4	26.4	31.4	32.0	
35.0	116	-31.9			-30.4	-18.4	-15.4	-11.0	-1.5	15.6	23.2	26.4	31.4	32.4	32.7	
36.0	116	-39.5			-21.4	-19.7	-17.7	-13.6	-0.7	11.3	22.2	29.4	30.4	32.0	32.2	
37.0	114	-32.8			-21.0	-20.4	-17.5	-11.6	-1.4	11.0	14.7	24.7	29.0	33.6	31.4	
38.0	116	-31.5			-22.4	-14.7	-17.1	-11.4	-1.1	10.7	21.4	25.0	27.0	30.0	31.0	
39.0	117	-22.5			-20.4	-19.7	-14.1	-10.2	-1.2	12.2	20.2	24.4	34.4	36.1	36.4	
40.0	116	-22.9			-22.9	-22.2	-17.1	-4.0	-0.0	10.4	21.1	26.4	37.4	42.6	42.6	
41.0	117	-20.4			-14.0	-16.3	-14.1	-10.2	-1.1	11.2	10.1	24.4	42.4	44.1	44.4	
42.0	114	-16.9			-16.0	-14.7	-13.6	-10.0	0.4	11.5	24.4	29.0	41.0	57.4	57.4	
43.0	113	-22.4			-16.0	-15.4	-13.4	-4.1	1.4	11.0	23.2	26.4	46.0	56.0	56.2	
44.0	113	-20.5			-14.0	-15.4	-14.7	-7.4	2.6	11.4	21.4	37.4	39.0	43.4	43.6	
45.0	111	-19.7			-14.0	-17.7	-16.2	-7.5	4.1	14.3	21.6	29.4	31.0	45.4	45.7	
46.0	110	-25.5			-21.0	-17.5	-14.7	-4.3	5.4	15.3	25.3	35.0	36.0	44.6	44.7	
47.0	104	-20.3			-22.0	-21.3	-15.0	-7.3	7.4	14.4	23.7	43.4	46.0	55.2	55.4	
48.0	104	-20.6			-23.0	-19.6	-12.4	-6.1	4.0	14.0	24.4	43.4	44.0	54.1	54.3	
49.0	100	-31.7			-32.0	-14.4	-15.0	-4.7	5.0	17.1	20.0	33.7	44.0	47.4	47.7	
50.0	100	-34.3			-34.0	-16.7	-14.7	-6.5	3.4	17.4	20.0	35.7	36.7	37.4	37.5	
51.0	94	-24.1				-16.4	-13.6	-7.0	4.1	14.4	24.4	25.0	26.4	26.7	26.7	
52.0	84	-30.7				-24.0	-19.6	-10.0	0.7	15.4	20.6	23.0	25.4	27.4	27.5	
53.0	81	-34.1				-25.1	-22.6	-10.4	0.3	15.4	20.7	25.1	26.2	27.2	27.4	
54.0	72	-27.2					-22.4	-12.4	1.0	16.0	22.4	24.0	24.0	25.1	25.2	
55.0	64	-24.0				-25.4	-24.9	-13.7	-2.7	15.4	21.4	23.4	23.4	24.4	24.4	
56.0	57	-24.9				-24.7	-25.1	-15.6	-0.7	16.0	21.2	25.7	31.6	32.1	32.2	
57.0	46	-32.0						-13.4	0.0	13.7	23.7	29.4	30.4	41.0	41.1	
58.0	26	-42.3					-34.7	-14.3	-0.0	14.4	25.7	31.4	32.0	32.3	32.4	
59.0	14	-30.5						-34.1	-2.0	14.1	23.1	23.4	23.6	23.6	23.6	
60.0	10	-34.0						-35.4	-1.0	9.4	14.4	14.4	14.6	14.6	14.6	
61.0	7	-34.8						-26.0	-6.5	-2.1	14.4	14.4	14.4	14.7	14.7	
62.0	6	-22.0						-4.4	-4.4	14.0	18.7	14.4	14.0	14.0	14.0	
63.0	5	-15.9						-0.5	14.3	19.0	19.2	14.4	14.4	14.4	14.4	
64.0	4	-14.5						-14.0	14.3	19.7	14.4	14.4	14.4	14.4	14.4	
65.0	3	-11.5							10.5	10.4	10.0	10.0	10.0	11.0	11.0	
66.0	3	-14.5							-12.6	4.6	3.0	4.0	4.0	4.1	4.1	
67.0	3	-24.6							-14.6	-1.2	-0.7	-0.4	-0.4	-0.5	-0.5	
68.0	4	-20.8							-14.0	-0.6	0.0	0.1	0.2	0.2	0.2	
69.0	4	-24.2							-15.0	-0.5	0.0	0.2	0.3	0.3	0.3	
70.0	4	-25.4							-14.6	-1.2	-1.1	-1.0	-1.0	-1.0	-1.0	

Positive is wind from the right (165°).
Negative is wind from the left (345°).

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM 888	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
57C	678	-12.0			-9.0	-7.8	-6.5	-3.9	-0.6	-2.7	-4.6	-6.4	-7.3	-11.0	-12.0	
1.0	678	-19.0			-14.0	-12.2	-9.5	-5.2	-0.0	-6.4	-11.5	-14.8	-16.8	-20.5	-21.0	
2.0	678	-21.0			-16.8	-16.1	-11.9	-6.2	-0.3	-5.2	-9.6	-11.9	-14.3	-20.0	-21.0	
3.0	678	-27.0			-22.6	-18.7	-14.0	-6.8	-0.9	-5.2	-10.0	-11.6	-13.2	-22.0	-23.0	
4.0	678	-31.0			-24.4	-20.4	-15.0	-7.4	-1.1	-5.6	-10.7	-12.6	-14.7	-27.0	-28.0	
5.0	678	-37.0			-26.2	-22.8	-16.8	-9.0	-1.1	-5.4	-11.0	-13.5	-15.3	-28.0	-29.0	
6.0	678	-36.0			-26.5	-22.8	-16.8	-9.6	-1.6	-5.2	-11.8	-14.3	-17.6	-26.5	-27.0	
7.0	678	-35.0			-27.1	-22.8	-18.7	-10.8	-2.5	-5.8	-12.3	-15.2	-19.4	-41.0	-42.0	
8.0	678	-35.0			-27.8	-24.6	-20.9	-12.5	-3.4	-5.5	-12.6	-16.5	-24.1	-36.0	-37.0	
9.0	678	-39.0			-31.6	-25.6	-21.7	-14.0	-4.2	-5.4	-13.0	-17.1	-27.2	-44.0	-45.0	
10.0	678	-48.0			-36.6	-28.7	-26.0	-16.4	-6.7	-6.8	-13.0	-18.8	-24.6	-41.0	-42.0	
11.0	678	-63.0			-38.4	-31.8	-27.7	-18.4	-5.4	-6.9	-13.8	-19.6	-24.6	-43.0	-44.0	
12.0	678	-58.0			-38.2	-33.2	-28.8	-19.0	-5.6	-4.7	-13.3	-17.2	-22.4	-44.0	-45.0	
13.0	678	-43.0			-34.7	-31.2	-26.4	-16.6	-6.6	-3.7	-9.0	-13.9	-17.6	-31.5	-32.0	
14.0	678	-48.0			-32.1	-27.4	-22.6	-16.1	-5.9	-2.0	-8.1	-11.5	-15.7	-32.0	-33.0	
15.0	678	-57.0			-28.6	-23.8	-20.6	-14.1	-5.3	-1.9	-6.3	-10.3	-12.7	-23.0	-24.0	
16.0	678	-40.0			-24.2	-21.2	-17.9	-12.5	-4.6	-1.6	-6.7	-8.8	-10.7	-21.0	-22.0	
17.0	678	-26.0			-23.1	-19.3	-15.8	-10.5	-4.0	-1.2	-4.9	-8.0	-9.3	-17.0	-18.0	
18.0	678	-23.0			-17.6	-15.7	-12.8	-8.7	-2.9	-0.8	-3.3	-5.0	-6.7	-11.0	-12.0	
19.0	678	-19.0			-14.1	-12.0	-9.5	-6.0	-2.1	-1.0	-3.9	-4.9	-6.5	-9.0	-10.0	
20.0	678	-14.0			-10.1	-9.0	-7.3	-4.6	-1.1	-1.6	-3.1	-3.6	-4.5	-6.0	-7.0	
21.0	678	-19.0			-14.6	-10.8	-8.2	-4.6	-0.8	-1.7	-4.9	-6.9	-8.4	-16.0	-17.0	
22.0	678	-33.0			-11.6	-9.6	-7.5	-4.5	-0.9	-1.6	-3.8	-5.5	-6.8	-10.0	-11.0	
23.0	678	-18.0			-11.4	-8.6	-6.9	-4.3	-0.6	-1.9	-4.7	-6.5	-8.7	-13.0	-14.0	
24.0	678	-17.0			-10.0	-8.3	-6.3	-3.8	-0.7	-2.0	-4.6	-7.1	-9.8	-20.0	-21.0	
25.0	678	-16.0			-9.8	-8.0	-6.7	-3.8	-0.9	-1.5	-4.3	-5.9	-8.3	-11.0	-12.0	
26.0	678	-18.0			-10.6	-7.7	-6.3	-4.4	-1.2	-1.3	-4.8	-7.0	-9.2	-18.0	-19.0	
27.0	678	-19.0			-10.0	-8.2	-6.9	-4.6	-1.1	-1.6	-4.7	-7.6	-10.2	-18.0	-19.0	
28.0	82	-7.1			-6.4	-6.2	-4.2	-0.5	-1.0	-1.0	-4.6	-8.1	-9.2	-9.0	-10.0	
29.0	82	-9.8			-9.1	-7.0	-5.0	-1.5	-3.0	-5.1	-7.1	-11.0	-12.0	-12.0	-12.3	
30.0	81	-14.7			-8.4	-8.2	-5.0	-1.1	-2.7	-7.1	-8.2	-12.0	-12.0	-12.0	-12.9	
31.0	81	-12.2			-9.2	-8.3	-6.8	-0.7	-4.3	-6.8	-7.2	-10.1	-10.6	-10.6	-10.7	
32.0	81	-12.2			-11.2	-9.0	-6.8	-0.3	-5.6	-9.2	-9.2	-11.1	-12.1	-12.1	-12.4	
33.0	84	-14.8			-14.8	-12.6	-7.6	-3.0	-3.0	-5.0	-6.7	-8.2	-9.2	-9.2	-9.4	
34.0	94	-17.2			-15.0	-14.1	-10.8	-5.2	-0.5	-4.7	-7.0	-11.0	-11.7	-11.8	-11.8	
35.0	100	-14.9			-14.3	-13.2	-10.2	-6.2	-1.5	-5.5	-7.7	-9.0	-10.7	-10.8	-10.8	
36.0	102	-20.2			-18.7	-16.4	-12.2	-5.6	-0.3	-6.9	-8.7	-10.0	-10.6	-10.7	-10.7	
37.0	105	-19.3		-19.0	-18.1	-15.7	-12.2	-5.6	-0.3	-5.2	-9.4	-10.0	-10.6	-10.9	-10.9	
38.0	107	-19.4		-18.0	-17.4	-16.5	-12.1	-5.9	-0.0	-5.7	-9.4	-11.5	-12.1	-12.1	-12.1	
39.0	109	-20.7			-20.6	-18.9	-12.5	-6.2	-0.9	-6.2	-9.6	-11.5	-12.0	-12.1	-12.1	
40.0	109	-22.3		-19.0	-16.9	-16.1	-11.7	-11.7	-5.9	-2.7	-7.4	-9.6	-10.0	-14.8	-14.9	
41.0	112	-27.8			-22.7	-20.4	-17.7	-14.4	-4.7	-3.7	-10.7	-14.2	-14.0	-25.4	-26.0	
42.0	109	-22.1			-22.0	-21.1	-18.1	-12.7	-3.1	-5.2	-11.1	-15.1	-17.2	-21.4	-21.9	
43.0	104	-27.6			-22.0	-21.5	-20.2	-12.4	-2.9	-5.2	-13.6	-15.8	-16.0	-19.5	-19.6	
44.0	106	-23.6			-21.6	-21.4	-18.7	-11.5	-2.0	-4.6	-11.0	-14.6	-19.2	-22.0	-23.0	
45.0	106	-22.9			-21.0	-20.1	-16.8	-10.8	-0.5	-9.0	-11.4	-14.4	-31.0	-35.6	-35.6	
46.0	102	-20.0			-19.0	-16.8	-15.4	-10.8	-0.1	-9.4	-14.2	-21.7	-39.0	-44.8	-45.0	
47.0	102	-14.8		-18.0	-15.0	-14.0	-10.0	-0.8	-0.1	-9.0	-15.1	-20.7	-36.0	-43.0	-43.2	
48.0	94	-20.3			-16.0	-16.3	-10.0	-1.0	-4.5	-17.1	-22.8	-28.0	-28.0	-29.0	-29.0	
49.0	95	-28.4			-21.4	-18.2	-12.4	-2.6	-0.0	-16.1	-18.4	-19.0	-19.5	-19.6	-19.6	
50.0	90	-26.7			-21.0	-17.5	-11.4	-4.2	-0.4	-13.4	-16.0	-21.1	-21.0	-22.0	-22.0	
51.0	83	-35.8			-22.1	-18.4	-12.4	-3.2	-4.4	-17.4	-18.4	-19.2	-20.1	-20.5	-20.5	
52.0	80	-41.6			-20.6	-19.5	-14.3	-3.0	-4.4	-18.0	-22.2	-24.2	-24.0	-25.0	-25.0	
53.0	74	-44.8			-30.1	-21.1	-14.5	-4.4	-0.1	-19.2	-23.1	-31.1	-32.2	-32.3	-32.3	
54.0	64	-50.1			-27.4	-23.7	-14.8	-4.7	-7.8	-18.7	-28.4	-34.4	-35.1	-35.2	-35.2	
55.0	60	-52.5			-27.4	-24.0	-15.7	-3.0	-10.7	-21.5	-29.4	-34.4	-34.7	-34.7	-34.7	
56.0	50	-50.7			-29.0	-27.5	-17.5	-6.0	-11.1	-18.6	-26.0	-29.4	-30.2	-30.3	-30.3	
57.0	45	-62.1			-29.7	-20.7	-17.0	-6.4	-11.4	-16.4	-18.0	-24.4	-25.0	-25.1	-25.1	
58.0	30	-59.4			-25.0	-25.0	-15.0	-6.2	-7.4	-16.1	-17.1	-17.7	-18.1	-18.2	-18.2	
59.0	27	-51.6			-25.6	-25.6	-15.0	-3.2	-3.0	-22.7	-29.4	-29.4	-29.4	-29.4	-29.4	
60.0	20	-52.4			-25.0	-23.4	-15.0	-0.5	-7.4	-28.0	-32.4	-32.4	-32.4	-33.0	-33.0	
61.0	13	-34.8			-16.0	-16.0	-15.0	-4.5	-4.0	-28.4	-28.4	-28.7	-28.4	-28.4	-28.4	
62.0	7	-23.9			-20.9	-13.2	-0.0	-3.7	-3.0	-3.0	-3.0	-4.0	-4.1	-4.1	-4.1	
63.0	4	-26.6				-12.0	-5.2	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	
64.0	2	-25.5				-26.0	-8.0	-8.2	-8.2	-8.2	-8.2	-8.2	-8.1	-8.1	-8.1	
65.0	1	-14.2														
66.0	2	-11.1														
67.0	1	-12.6														
68.0	1	-45.0														
69.0	3	-25.8														
70.0	3	-60.1														
Positive is wind from the right (165°). Negative is wind from the left (345°).																
									-17.5	14.5	13.0	14.0	14.0	14.1	14.1	
									-23.5	8.4	8.7	8.0	8.4	8.4	8.4	
									-4.5	6.5	6.0	7.0	7.0	7.0	7.0	

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH TABLE 9.3

DATA SOURCE							MARCH									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-13.0		-11.9	-8.9	-7.7	-6.4	-3.7	-0.4	+2.6	+4.9	+6.3	+7.1	+9.9	+12.0	
1.0	744	-19.0		-17.9	-14.1	-11.5	-9.3	-5.2	-0.1	+2.1	+9.3	+11.0	+13.7	+17.9	+20.0	
2.0	744	-24.0		-21.9	-16.7	-13.6	-10.7	-5.8	-0.6	+3.9	+7.8	+9.7	+11.7	+15.9	+20.0	
3.0	744	-32.0		-25.9	-19.7	-14.5	-11.5	-7.3	-1.5	+3.6	+8.3	+10.5	+12.1	+14.9	+19.0	
4.0	744	-32.0		-28.9	-20.5	-16.1	-13.8	-9.3	-2.8	+3.2	+8.3	+11.4	+13.8	+17.9	+24.0	
5.0	744	-32.0		-30.9	-21.5	-18.4	-15.7	-10.6	-3.9	+2.3	+7.9	+11.0	+13.5	+20.9	+24.0	
6.0	744	-39.0		-32.9	-22.2	-20.1	-16.6	-12.2	-4.6	+2.3	+7.6	+12.5	+16.6	+23.9	+33.0	
7.0	744	-37.0		-34.9	-25.5	-22.6	-18.8	-13.4	-5.7	+2.5	+9.2	+12.2	+18.1	+29.9	+37.0	
8.0	744	-34.0		-33.9	-27.5	-24.0	-20.9	-15.2	-6.4	+2.0	+8.9	+13.0	+19.5	+25.9	+37.0	
9.0	744	-41.0		-39.9	-34.5	-28.3	-24.7	-17.4	-7.5	+2.1	+10.4	+15.7	+22.5	+44.9	+49.0	
10.0	744	-63.0		-51.9	-36.5	-33.0	-28.8	-21.0	-8.3	+2.0	+12.1	+18.2	+30.5	+42.4	+43.0	
11.0	744	-60.0		-55.9	-44.5	-39.0	-32.9	-23.0	-8.8	+2.0	+12.2	+22.0	+38.2	+47.9	+52.0	
12.0	744	-66.0		-56.9	-42.8	-38.5	-33.1	-23.4	-9.8	+2.3	+12.3	+18.3	+23.5	+39.9	+44.0	
13.0	744	-52.0		-51.9	-40.5	-34.3	-28.9	-21.5	-10.2	+0.9	+9.5	+13.6	+22.5	+34.4	+35.0	
14.0	744	-47.0		-44.9	-35.2	-29.3	-25.6	-18.8	-9.4	+0.1	+5.4	+9.6	+13.5	+23.9	+25.0	
15.0	744	-32.0		-31.9	-28.6	-25.0	-22.8	-16.4	-8.2	+0.1	+5.5	+8.5	+11.7	+26.9	+28.0	
16.0	744	-28.0		-27.9	-24.5	-21.7	-19.4	-14.1	-7.0	+0.0	+5.1	+8.8	+11.7	+15.9	+30.0	
17.0	744	-32.0		-26.9	-21.8	-18.7	-16.5	-11.6	-4.9	+0.4	+5.9	+9.0	+11.7	+15.9	+17.0	
18.0	744	-32.0		-23.9	-18.1	-15.4	-13.1	-8.9	-4.0	+0.4	+4.1	+6.8	+10.5	+18.9	+21.0	
19.0	744	-21.0		-19.9	-13.8	-11.3	-9.6	-6.5	-2.5	+0.6	+3.8	+7.6	+9.6	+18.9	+20.0	
20.0	744	-16.0			-11.3	-9.6	-7.6	-4.9	-1.5	+1.3	+4.4	+6.8	+9.7	+12.4	+13.0	
21.0	744	-18.0		-16.9	-9.5	-7.8	-6.5	-4.2	-1.1	+1.5	+4.8	+7.0	+9.3	+12.9	+16.0	
22.0	744	-19.0		-13.9	-9.5	-7.9	-6.3	-3.8	-0.7	+1.8	+4.1	+6.2	+9.7	+21.9	+23.0	
23.0	744	-15.0		-11.9	-8.3	-7.4	-5.9	-3.3	-0.6	+1.9	+4.5	+6.7	+10.5	+20.9	+22.0	
24.0	744	-27.0		-14.9	-9.5	-7.5	-5.6	-3.3	-0.6	+2.0	+4.6	+6.5	+9.8	+17.9	+23.0	
25.0	744	-13.0		-11.9	-9.9	-8.3	-6.2	-3.7	-0.7	+1.8	+4.5	+5.9	+7.8	+10.9	+16.0	
26.0	744	-16.0		-9.1	-8.1	-6.8	-4.1	-2.8	-0.8	+1.3	+3.1	+5.6	+7.5	+15.9	+17.0	
27.0	744	-14.0		-9.1	-8.7	-7.1	-4.5	-1.1	+1.8	+4.9	+7.1	+8.1	+14.9	+17.0		
28.0	93	-7.2			-5.0	-3.9	-2.0	1.3	0.4	5.4	8.0	8.4	9.1			
29.0	93	-11.0			-5.0	-4.6	-2.8	1.2	0.5	7.0	9.0	10.0	10.4			
30.0	97	-6.8			-5.8	-5.6	-3.8	-0.8	0.0	7.2	8.6	9.0	10.2			
31.0	94	-11.8			-9.8	-8.1	-4.7	-1.2	3.0	6.1	7.6	8.6	9.0			
32.0	101	-14.2			-11.7	-9.0	-7.0	-2.0	3.3	6.3	7.8	8.0	13.0			
33.0	103	-16.1			-14.0	-12.8	-11.8	-2.0	2.9	2.4	5.4	7.0	10.0			
34.0	103	-15.0			-15.0	-13.8	-12.8	-10.6	-3.2	2.8	6.7	7.6	8.0			
35.0	100	-31.9			-22.0	-20.5	-15.6	-11.3	-4.3	4.6	8.8	12.6	13.0			
36.0	100	-19.8			-18.5	-16.3	-11.3	-4.6	3.8	9.9	12.8	15.0	15.0			
37.0	113	-23.7			-19.0	-15.7	-10.8	-5.3	3.5	11.2	16.0	19.0	19.0			
38.0	113	-28.0			-21.0	-17.7	-15.3	-11.7	-4.0	3.8	10.7	13.4	14.0			
39.0	114	-30.3			-21.0	-19.4	-16.8	-13.3	-5.5	3.8	10.7	14.2	14.2			
40.0	116	-27.2			-18.8	-17.8	-16.9	-13.0	-5.1	2.3	13.1	14.7	15.4			
41.0	116	-35.0			-31.0	-21.8	-19.1	-13.0	-5.7	1.0	14.1	15.7	17.8			
42.0	116	-25.9			-21.0	-20.8	-18.6	-13.2	-6.0	1.9	13.5	17.0	22.8			
43.0	116	-18.6			-18.6	-18.2	-17.1	-12.5	-5.0	2.8	18.7	17.4	21.0			
44.0	113	-19.8			-18.0	-17.8	-15.1	-10.5	-4.6	4.5	18.2	16.0	17.0			
45.0	111	-26.8			-17.0	-15.7	-14.5	-9.3	-3.2	6.3	10.5	12.8	18.0			
46.0	110	-30.5			-18.0	-17.5	-14.5	-9.6	-2.0	4.7	10.8	14.0	19.0			
47.0	104	-22.3			-18.5	-15.6	-14.4	-9.0	-2.0	5.0	10.3	13.5	20.0			
48.0	107	-22.4			-21.0	-17.6	-12.2	-8.8	-1.6	4.7	8.8	15.6	21.0			
49.0	106	-24.3			-18.0	-18.4	-12.7	-8.8	-2.1	4.2	12.8	17.8	18.0			
50.0	102	-27.6			-19.0	-18.7	-12.3	-8.8	-3.0	4.4	11.6	14.8	15.0			
51.0	97	-25.2			-15.6	-15.1	-10.7	-8.7	-2.9	3.7	13.2	15.0	20.0			
52.0	94	-22.5			-18.0	-17.6	-12.6	-4.7	4.0	11.3	13.0	27.1	29.0			
53.0	87	-20.6			-20.5	-18.8	-14.3	-6.1	2.0	6.7	12.0	12.7	13.2			
54.0	80	-22.2			-21.2	-19.5	-15.1	-10.5	1.2	5.8	11.1	11.9	12.2			
55.0	69	-24.7			-22.4	-17.8	-16.0	-5.8	0.6	5.6	7.7	12.3	13.0			
56.0	60	-24.8			-20.6	-18.7	-13.5	-5.2	3.5	7.0	7.0	8.8	9.0			
57.0	51	-23.8			-23.7	-17.7	-14.3	-4.1	3.0	11.5	12.0	14.3	14.6			
58.0	41	-29.9				-18.6	-17.8	-3.5	5.2	13.0	26.0	26.4	26.7			
59.0	32	-21.2				-18.7	-11.3	-2.0	9.5	17.4	38.2	38.4	38.8			
60.0	22	-29.0				-16.0	-9.8	2.0	13.5	25.0	43.7	44.2	44.5			
61.0	14	-18.9				-8.0	-8.0	20.8	46.2	46.8	46.8	46.5	46.5			
62.0	10	-21.5				-9.4	1.0	15.7	35.3	35.0	36.5	36.5	36.5			
63.0	7	-21.1				-12.0	4.5	11.0	32.4	32.4	32.4	32.4	32.4			
64.0	5	-12.9					4.5	13.2	14.0	14.0	14.1	14.1	14.1			
65.0	3	-5.8					-5.5	2.4	2.4	2.4	2.7	2.7	2.7			
66.0	2	-12.5					-13.0	-8.4	-8.5	-8.8	-8.8	-8.8	-8.8			
67.0	1	-18.8														
68.0	1	-4.2														
69.0	1	2.2														
70.0	1	-4.8														

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1957										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 720	111.0	-8.3	-7.2	-5.1	-2.0	-0.2	+2.7	+4.7	+5.6	+6.5	+8.6	+9.0				
170 720	118.0	-12.5	-10.2	-8.3	-4.6	-0.2	+4.9	+8.4	+9.9	+13.2	+16.5	+17.0				
210 720	117.0	-13.3	-11.9	-9.8	-5.0	-0.8	+3.4	+6.8	+8.9	+11.1	+12.0	+13.0				
310 720	122.0	-18.9	-16.1	-12.8	-7.9	-2.0	+2.6	+6.2	+8.1	+10.8	+15.0	+16.0				
410 720	122.0	-22.3	-18.8	-14.1	-9.3	-2.8	+1.9	+5.3	+7.5	+9.6	+13.0	+14.0				
510 720	131.0	-21.9	-18.5	-15.7	-10.6	-3.6	+1.2	+5.1	+6.8	+9.4	+19.5	+20.0				
610 720	130.0	-25.8	-20.9	-17.4	-12.5	-4.5	+0.6	+4.6	+7.8	+9.4	+14.0	+15.0				
710 720	138.0	-26.7	-22.8	-19.5	-13.8	-5.5	+0.1	+4.6	+7.5	+9.4	+22.0	+23.0				
810 720	139.0	-30.8	-25.6	-21.8	-16.0	-6.8	-0.3	+4.4	+7.1	+10.9	+15.6	+16.0				
910 720	149.0	-35.7	-27.8	-25.3	-17.8	-8.0	-0.2	+4.9	+8.1	+12.2	+21.0	+22.0				
1010 720	149.0	-39.8	-32.8	-28.7	-20.5	-9.0	-0.1	+4.8	+9.5	+14.8	+22.0	+23.0				
1110 720	156.0	-45.9	-38.5	-33.0	-23.5	-10.2	-0.2	+6.0	+9.9	+14.8	+23.0	+24.0				
1210 720	162.0	-46.8	-41.8	-35.7	-25.4	-11.2	-0.7	+5.8	+11.1	+14.9	+22.5	+23.0				
1310 720	155.0	-45.9	-41.8	-35.1	-25.1	-12.5	-2.1	+4.5	+7.7	+11.1	+16.0	+17.0				
1410 720	144.0	-38.2	-34.9	-31.2	-23.2	-11.8	-2.3	+3.1	+4.8	+10.2	+13.0	+14.0				
1510 720	140.0	-30.1	-28.1	-25.6	-18.7	-10.2	-2.5	+2.2	+4.3	+8.2	+13.0	+14.0				
1610 720	135.0	-28.3	-25.8	-21.2	-15.9	-8.6	-1.7	+1.8	+4.3	+7.1	+13.0	+14.0				
1710 720	131.0	-23.2	-20.1	-17.0	-12.8	-6.6	-0.9	+2.2	+5.1	+7.4	+19.0	+20.0				
1810 720	123.0	-17.5	-14.8	-13.0	-9.8	-4.6	-0.3	+2.0	+4.1	+5.9	+11.0	+12.0				
1910 720	120.0	-11.9	-11.0	-9.2	-6.3	-2.5	+0.0	+2.6	+4.9	+6.9	+18.0	+19.0				
2010 720	126.0	-10.9	-8.6	-7.0	-4.7	-1.3	+1.3	+4.4	+5.9	+6.8	+10.0	+11.0				
2110 720	119.0	-8.7	-7.4	-5.8	-3.6	-0.9	+1.2	+3.3	+4.7	+6.2	+11.0	+12.0				
2210 720	118.0	-7.9	-6.8	-5.2	-3.2	-0.5	+1.8	+4.0	+5.1	+5.9	+7.5	+8.0				
2310 720	116.0	-8.5	-7.2	-5.2	-3.0	-0.4	+1.9	+3.8	+5.1	+6.8	+10.0	+11.0				
2410 720	110.0	-7.6	-6.5	-5.2	-2.9	-0.5	+1.9	+3.8	+5.8	+7.2	+13.0	+14.0				
2510 720	99.0	-7.6	-6.5	-5.1	-2.9	-0.6	+1.6	+4.1	+5.5	+7.9	+8.8	+9.0				
2610 720	111.0	-7.5	-5.8	-4.7	-3.1	-0.6	+1.8	+3.8	+5.3	+6.7	+12.0	+13.0				
2710 720	112.0	-9.4	-7.2	-5.9	-3.6	-0.6	+1.9	+4.4	+6.0	+7.3	+8.6	+9.0				
2810 94	94.2	-5.4	-5.4	-5.4	-2.0	0.4	3.0	7.0	7.0	16.0	16.5	16.5				
2910 94	120.0	-5.7	-4.4	-4.4	-2.7	0.4	4.1	7.0	7.7	9.0	10.2	10.4				
3010 101	111.3	-9.0	-8.4	-6.0	-4.2	0.4	4.0	6.4	7.4	8.0	9.0	9.1				
3110 107	94.7	-9.7	-7.3	-7.2	-4.2	0.4	3.5	5.3	7.4	8.0	10.6	10.7				
3210 106	94.5	-9.7	-7.3	-7.2	-4.2	0.4	3.5	5.3	7.4	8.0	10.6	10.7				
3310 104	101.7	-10.4	-10.3	-7.4	-4.8	-1.1	2.3	4.7	6.0	7.0	10.2	10.4				
3410 103	115.5	-12.5	-10.5	-7.7	-4.9	-2.0	1.4	5.2	7.4	8.5	9.1	9.2				
3510 110	116.6	-14.7	-13.2	-8.4	-4.7	-2.7	1.7	5.3	6.7	8.4	9.9	11.2	11.4			
3610 112	110.8	-16.0	-16.2	-15.1	-10.4	-2.7	3.5	6.1	6.0	8.4	9.0	9.0				
3710 112	121.5	-18.0	-17.7	-15.2	-11.3	-2.5	4.1	5.0	7.1	7.5	7.7	7.7				
3810 114	124.4	-20.0	-17.7	-16.4	-10.4	-3.1	4.2	7.1	7.0	4.0	9.9	10.1				
3910 112	117.3	-15.4	-9.1	-1.5	6.1	9.1	9.0	10.0	13.5	13.5	13.5	13.5				
4010 112	120.7	-17.0	-16.4	-13.4	-10.6	-1.7	5.0	8.7	10.7	11.6	12.0	12.1				
4110 113	115.0	-12.7	-11.7	-10.2	-7.2	-1.7	4.5	7.7	8.0	9.0	11.2	11.6				
4210 112	115.8	-14.0	-13.7	-13.2	-7.2	-1.2	4.2	6.7	7.6	11.0	17.4	18.0				
4310 112	118.5	-17.0	-16.7	-13.2	-10.0	-1.0	5.7	9.2	10.7	12.0	15.1	15.3				
4410 111	124.4	-19.0	-18.7	-11.2	-6.4	1.1	7.4	11.6	13.4	15.0	17.2	17.4				
4510 110	119.2	-18.5	-18.5	-10.2	-6.1	2.3	4.1	13.6	15.4	16.0	14.0	14.2				
4610 107	118.9	-17.0	-16.6	-10.6	-6.3	1.2	10.0	14.7	18.4	19.0	20.3	20.5				
4710 105	121.6	-18.0	-17.6	-13.7	-6.3	2.3	10.1	13.6	14.4	17.0	17.5	17.6				
4810 103	119.2	-19.0	-18.7	-12.0	-6.3	1.1	8.7	11.0	15.4	16.0	23.7	23.9				
4910 104	115.6	-15.6	-15.4	-13.0	-8.2	1.2	7.7	12.0	16.7	19.0	19.1	19.3				
5010 100	117.9	-19.0	-18.7	-11.7	-7.0	1.3	7.3	13.6	15.7	17.0	18.4	18.7				
5110 100	121.1	-21.0	-19.7	-11.0	-5.4	1.4	7.4	13.3	14.7	17.0	17.9	18.1				
5210 98	116.6	-12.4	-11.5	-6.4	1.6	4.4	14.1	17.0	19.0	19.0	20.9	20.4				
5310 92	116.9	-12.0	-11.1	-6.1	1.3	7.4	11.5	17.0	19.0	19.0	19.5	19.5				
5410 80	117.0	-14.2	-12.5	-8.7	1.4	7.4	11.0	15.0	16.2	17.1	17.2	17.2				
5510 76	115.7	-15.6	-14.2	-6.1	0.2	7.0	9.0	12.1	12.6	12.8	12.9	12.9				
5610 54	114.0	-16.6	-13.4	-7.7	0.4	8.2	11.3	11.0	12.4	13.0	13.1	13.1				
5710 52	119.0	-13.4	-12.7	-7.0	0.6	7.4	11.4	12.0	13.7	14.4	14.5	14.5				
5810 46	114.5	-16.0	-14.8	-9.9	-1.3	6.9	12.7	14.0	15.3	15.6	15.6	15.5				
5910 35	114.8	-14.2	-14.2	-6.1	-0.5	8.7	12.6	13.2	13.4	13.4	13.9	13.9				
6010 26	122.2	-9.7	-9.7	-6.1	-0.5	10.0	13.4	16.4	16.5	16.6	16.5	16.5				
6110 14	122.4	-4.3	-4.3	-4.3	-4.3	10.5	17.7	24.3	24.0	24.5	24.5	24.5				
6210 4	13.1	-12.0	-12.0	-12.0	-12.0	33.2	33.5	33.4	33.4	33.4	33.4	33.4				
6310 4	2.8	-12.0	-12.0	-12.0	-12.0	6.3	6.7	6.8	6.8	6.8	6.8	6.8				
6410 4	21.5	-14.0	-14.0	-14.0	-14.0	0.7	1.0	1.0	1.1	1.1	1.1	1.1				
6510 2	16.2	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4	2.4	2.7	2.7				
6610 2	0.3	-2.0	-2.0	-2.0	-2.0	0.4	0.7	0.8	0.8	0.8	0.8	0.8				
6710 2	2.2	-7.0	-7.0	-7.0	-7.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4				
6810 2	7.2	-8.0	-8.0	-8.0	-8.0	14.0	15.2	15.3	15.3	15.3	15.3	15.3				
6910 2	4.3	-0.0	-0.0	-0.0	-0.0	24.0	24.4	24.4	24.4	24.4	24.4	24.4				
7010 2	0.1															

Positive is wind from the right (165°).
Negative is wind from the left (345°).

DATA SOURCE											MAY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA					EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)					
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
57C	744	-9.0	-8.9	-6.7	-5.0	-3.3	-1.4	0.2	2.4	3.9	4.9	5.8	6.9	8.0		
10	744	-14.0	-13.9	-8.7	-7.7	-6.0	-2.8	0.0	3.9	6.6	7.8	9.1	10.9	12.0		
20	744	-13.0		-10.5	-8.7	-7.2	-4.4	-0.7	2.8	5.4	6.7	8.1	9.9	13.0		
30	744	-16.0	-15.9	-11.8	-9.7	-8.3	-4.9	-0.8	2.3	5.7	7.7	9.4	11.9	15.0		
40	744	-18.0		-13.5	-11.4	-9.3	-5.9	-1.3	2.6	5.7	7.8	9.9	13.9	17.0		
50	744	-20.0		-16.2	-13.5	-10.8	-6.9	-1.6	2.5	6.2	7.8	9.9	13.9	15.0		
60	744	-21.0		-17.7	-15.3	-13.0	-8.3	-2.2	3.0	6.4	8.8	10.7	15.9	24.0		
70	744	-26.0	-24.9	-20.7	-17.2	-14.2	-9.1	-2.4	2.7	7.4	10.0	12.6	21.9	40.0		
80	744	-28.0	-27.9	-21.5	-19.6	-16.6	-10.4	-2.4	3.4	8.4	12.5	15.8	25.9	30.0		
90	744	-31.0		-25.5	-23.1	-19.4	-12.9	-3.0	3.9	10.7	14.6	21.2	27.9	31.0		
100	744	-37.0	-36.9	-30.5	-28.0	-22.9	-14.0	-4.0	4.6	12.3	17.0	22.2	30.9	33.0		
110	744	-42.0	-40.9	-34.5	-30.1	-25.4	-15.9	-4.6	4.9	14.3	19.2	25.1	30.9	36.0		
120	744	-43.0	-42.9	-37.2	-34.7	-28.3	-18.4	-5.9	5.2	15.1	20.4	22.7	29.9	34.0		
130	744	-47.0		-39.7	-34.7	-29.5	-20.5	-7.0	3.7	11.6	16.6	19.8	23.9	26.0		
140	744	-47.0		-41.9	-36.1	-30.0	-26.1	-19.0	-7.4	11.7	17.7	13.0	16.9	24.9		
150	744	-30.0	-29.9	-24.8	-24.0	-21.2	-14.3	-7.8	0.6	5.5	8.0	10.8	17.9	19.0		
160	744	-24.0	-23.9	-20.9	-19.7	-17.3	-13.1	-6.9	-0.1	4.4	6.5	8.6	10.9	12.0		
170	744	-20.0	-18.9	-17.3	-15.8	-13.8	-10.1	-4.9	-0.1	3.4	5.6	6.9	9.9	10.0		
180	744	-18.0	-17.9	-13.9	-12.4	-10.3	-7.4	-3.3	0.1	3.1	4.7	6.2	8.6			
190	744	-18.0	-16.9	-9.9	-8.8	-7.1	-4.7	-1.3	1.1	2.9	4.0	4.7	7.9	9.0		
200	744	-11.0	-10.9	-7.6	-6.4	-5.2	-3.3	-0.7	1.3	3.1	4.5	5.6	7.9	11.0		
210	744	-9.0	-7.9	-5.9	-4.8	-3.8	-2.3	-0.3	2.1	4.1	5.5	6.5	7.7	8.0		
220	744	-7.0		-6.2	-5.2	-3.9	-1.9	-0.1	2.5	4.7	5.7	6.9	14.9	18.0		
230	744	-6.0		-5.4	-4.6	-3.5	-1.6	-0.1	2.4	4.9	6.0	7.7	13.9	15.0		
240	744	-7.0	-6.9	-5.5	-4.6	-3.5	-1.5	0.3	3.2	5.3	6.6	8.1	10.9	12.0		
250	744	-11.0	-10.9	-6.5	-4.9	-3.8	-1.7	0.3	3.0	5.5	6.8	8.3	10.4	11.0		
260	744	-13.0	-12.9	-7.5	-5.2	-3.8	-1.6	0.3	3.3	5.5	6.5	7.3	8.9	10.0		
270	744	-9.0		-7.8	-5.6	-4.1	-2.0	0.2	3.4	5.3	7.1	8.3	10.4	11.0		
280	103	-5.9		-5.0	-5.3	-3.0	-1.6	1.7	5.5	7.0	7.0	10.0	11.3	11.5		
290	105	-10.9		-6.0	-5.8	-4.4	-2.1	1.7	6.1	8.4	9.0	11.5	12.0	12.0		
300	105	-4.1		-7.0	-6.0	-5.7	-2.8	2.3	6.1	8.4	9.0	11.0	12.0	12.1		
310	107	-12.3		-11.0	-10.4	-6.3	-3.3	1.5	5.5	7.0	9.4	10.6	11.3	11.4		
320	110	-9.7			-9.4	-7.8	-2.8	1.4	5.5	7.6	9.4	12.0	13.6	13.7		
330	112	-18.7		-12.0	-10.5	-6.2	-3.7	1.0	5.2	8.4	10.6	13.0	14.0	14.2		
340	113	-10.8		-10.7	-8.7	-4.0	0.5	5.5	8.4	9.7	10.6	11.0	11.4	11.5		
350	113	-12.1		-11.0	-11.2	-7.3	-3.0	0.5	5.5	8.4	9.0	13.0	15.1	15.3		
360	113	-16.1		-11.0	-10.4	-7.2	-4.2	0.5	5.4	8.7	11.7	12.0	15.7	16.4		
370	114	-11.5			-10.4	-8.1	-4.0	0.5	7.3	10.5	11.0	12.0	14.4	14.5		
380	112	-10.2		-12.0	-10.5	-7.2	-3.0	1.3	6.7	9.6	11.6	12.0	14.4	14.9		
390	112	-11.8		-11.7	-10.7	-8.4	-3.4	1.5	7.2	9.2	11.5	12.0	14.3	16.5		
400	115	-14.2		-11.8	-10.7	-7.5	-0.1	1.7	7.0	10.0	12.0	14.4	14.0	15.0		
410	116	-20.5		-12.8	-11.4	-6.2	-2.8	3.1	6.8	11.0	12.7	13.4	15.0	16.1		
420	116	-10.8		-8.8	-7.4	-5.6	-0.2	3.7	8.1	10.6	11.4	14.4	15.1	16.3		
430	113	-6.6		-6.5	-4.7	-3.4	-0.6	4.1	10.1	12.7	14.7	16.0	14.4	14.9		
440	112	-10.1		-7.0	-3.7	-2.2	0.0	5.4	10.1	15.0	14.3	16.0	21.0	21.2		
450	111	-4.5		-7.0	-6.5	-3.4	0.3	6.5	13.1	14.0	18.4	19.0	21.1	21.3		
460	104	-6.8		-5.0	-4.8	-3.8	0.3	7.4	13.6	17.4	19.0	20.0	23.4	23.5		
470	107	-9.7		-7.0	-6.6	-3.9	0.7	7.6	14.2	19.3	21.4	23.0	24.4	24.7		
480	106	-12.2		-11.0	-8.6	-6.7	0.3	8.1	14.0	16.0	20.4	21.0	23.0	23.2		
490	104	-16.1		-14.0	-11.4	-6.8	-0.2	9.0	13.9	16.0	19.6	21.0	22.1	22.3		
500	100	-13.2		-9.7	-9.7	-5.5	2.3	9.0	15.3	20.3	21.7	22.4	23.2	23.3		
510	98	-16.3		-6.0	-6.0	-4.5	1.3	9.0	15.7	18.5	20.4	26.0	27.2	27.4		
520	95	-12.9		-6.4	-5.4	-3.3	-1.3	8.5	15.2	20.4	21.0	25.1	26.0	26.1		
530	90	-18.2		-7.0	-5.5	0.1	4.7	15.5	21.5	23.0	30.1	30.4	31.0			
540	85	-4.6		-5.1	-3.7	1.3	7.0	16.1	22.0	31.1	33.1	33.3	33.5			
550	74	-9.0		-7.3	-5.1	0.7	4.7	15.1	26.1	26.0	27.3	28.2	28.3			
560	66	-14.9		-10.5	-6.4	-1.3	8.0	16.0	21.0	27.5	29.3	29.4	29.9			
570	57	-10.2		-6.7	-5.6	0.0	8.1	14.3	24.2	26.7	30.4	31.4	31.5			
580	43	-38.2			-5.6	-0.4	7.5	10.2	22.0	25.4	26.0	26.2	26.2			
590	33	-25.4			-15.3	-0.8	10.3	15.3	17.7	19.0	19.0	19.4	19.4			
600	20	-25.8			-26.0	-2.8		9.5	15.4	18.0	20.4	20.9	21.0			
610	12	-0.1						2.0	17.1	17.4	18.0	18.1	18.1			
620	9	-7.7					-3.6	-0.5	12.6	15.5	15.7	15.9	15.9			
630	2	-4.9						-5.0	12.7	12.0	12.0	12.0	13.0			
640	2	-7.4						-7.0	9.4	9.4	9.0	9.0	9.9			
650	2	-4.9						-10.0	6.5	6.8	6.0	6.0	6.0			
660	1	-13.0														
670	1	5.0														
680	1	5.9														
690	1	17.7														
700	1	22.9														

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 9.6

DATA SOURCE										JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-7.0			-5.3	-3.9	-2.6	-0.9	*0.0	*2.6	*4.2	*5.2	*6.3	*7.5	*8.0	
1.0	720	-8.0			-7.1	-5.7	-4.2	-1.6	*0.5	*3.9	*6.3	*8.5	*9.8	*18.0	*19.0	
2.0	720	-16.0			-7.9	-6.5	-4.6	-2.5	-0.2	*3.1	*5.7	*7.5	*9.4	*20.5	*21.0	
3.0	720	-12.0			-8.9	-7.2	-5.5	-2.8	-0.4	*2.9	*5.6	*7.5	*9.7	*21.0	*22.0	
4.0	720	-11.0			-8.7	-7.3	-6.1	-3.5	-0.5	*2.6	*6.0	*7.8	*10.2	*21.5	*22.0	
5.0	720	-11.0			-9.1	-7.6	-6.6	-4.3	-0.7	*2.5	*5.8	*7.5	*9.7	*22.0	*23.0	
6.0	720	-13.0			-10.1	-8.6	-7.3	-4.9	-1.1	*2.3	*5.5	*7.6	*10.4	*24.0	*25.0	
7.0	720	-13.0			-11.7	-10.5	-8.3	-5.3	-1.3	*2.4	*5.9	*6.9	*10.8	*24.0	*25.0	
8.0	720	-20.0			-14.6	-12.4	-9.0	-6.0	-1.5	*3.0	*6.6	*8.5	*10.6	*25.0	*26.0	
9.0	720	-21.0			-18.1	-14.4	-11.7	-7.1	-1.6	*3.8	*7.5	*9.6	*11.9	*22.0	*23.0	
10.0	720	-30.0			-19.9	-17.5	-14.7	-8.7	-1.8	*4.6	*9.5	*11.4	*13.9	*21.0	*22.0	
11.0	720	-36.0			-26.2	-20.9	-17.0	-10.1	-2.5	*5.0	*10.6	*13.1	*16.6	*22.0	*23.0	
12.0	720	-40.0			-30.1	-25.5	-21.1	-12.4	-3.2	*5.1	*11.2	*13.9	*17.9	*25.0	*26.0	
13.0	720	-43.0			-31.7	-28.6	-23.7	-14.1	-4.7	*4.2	*10.0	*12.9	*16.8	*23.5	*24.0	
14.0	720	-44.0			-31.2	-26.9	-21.0	-12.2	-5.5	*1.7	*5.8	*8.6	*10.9	*22.0	*23.0	
15.0	720	-30.0			-27.1	-21.8	-18.5	-12.5	-5.5	-0.1	*3.4	*4.8	*6.4	*10.0	*11.0	
16.0	720	-22.0			-17.6	-16.1	-13.1	-9.1	*4.5	-0.2	*2.9	*4.3	*5.6	*11.0	*12.0	
17.0	720	-16.0			-13.3	-10.9	-9.3	-6.0	-2.5	*0.2	*2.7	*4.3	*5.7	*9.0	*10.0	
18.0	720	-10.0			-8.6	-7.3	-6.1	-4.1	-0.9	*1.1	*3.1	*4.4	*5.7	*7.0	*8.0	
19.0	720	-11.0			-6.4	-5.1	-3.9	-2.0	-0.2	*2.1	*4.2	*5.1	*5.8	*8.5	*9.0	
20.0	720	-14.0			-5.6	-4.9	-2.7	-1.2	*0.3	*2.7	*4.4	*5.4	*6.4	*8.5	*9.0	
21.0	720	-13.0			-4.3	-3.6	-2.5	-0.8	*0.9	*3.7	*5.8	*6.9	*7.7	*11.0	*12.0	
22.0	720	-12.0			-4.7	-3.9	-3.0	-0.9	*1.7	*4.7	*6.6	*7.5	*8.3	*11.0	*12.0	
23.0	720	-13.0			-4.9	-3.7	-2.2	-0.6	*1.9	*4.9	*6.6	*7.5	*8.3	*11.0	*12.0	
24.0	720	-11.0			-3.7	-2.9	-1.8	-0.3	*2.2	*4.8	*6.5	*7.4	*8.4	*10.0	*11.0	
25.0	720	-10.0			-4.2	-3.1	-1.8	-0.3	*2.1	*4.7	*6.5	*7.5	*8.9	*11.7	*12.0	
26.0	720	-7.0			-3.8	-2.9	-1.9	-0.5	*1.9	*4.9	*7.2	*8.2	*10.6	*19.0	*20.0	
27.0	720	-8.0			-4.9	-3.6	-2.3	-0.5	*2.1	*4.8	*7.1	*8.3	*9.4	*13.0	*14.0	
28.0	103	-7.0					-1.0	-0.4	*1.0	*4.7	*6.4	*9.7	*11.0	*11.5	*11.6	
29.0	104	-4.7			-4.7	-3.4	-1.0	0.1	*1.8	*4.7	*6.5	*9.4	*10.6	*12.0	*12.4	
30.0	107	-4.8				-3.4	-1.7	1.1	*0.0	*7.2	*9.3	*11.0	*12.3	*14.4	*15.0	
31.0	108	-1.4					-0.8	1.2	*4.5	*7.0	*10.7	*12.6	*15.0	*16.4	*17.0	
32.0	109	-6.0			-4.0	-3.0	-1.5	0.0	*4.6	*4.3	*10.7	*12.6	*15.0	*16.4	*17.0	
33.0	104	-4.2			-4.0	-3.1	-1.6	1.3	*4.7	*7.4	*9.4	*11.5	*12.0	*15.1	*15.2	
34.0	110	-0.3				-3.7	-2.2	0.0	*4.3	*4.4	*10.5	*11.5	*12.0	*15.1	*15.3	
35.0	111	-4.7			-3.0	-3.2	-2.4	-0.1	*4.0	*4.2	*11.4	*12.5	*14.3	*14.5	*14.6	
36.0	111	-6.6			-5.0	-5.2	-3.5	-0.4	*4.0	*4.0	*12.2	*14.2	*14.0	*15.3	*15.4	
37.0	110	-5.6			-4.0	-3.7	-2.5	0.6	*4.7	*10.7	*12.6	*14.2	*16.0	*16.4	*16.7	
38.0	110	-5.0			-4.0	-3.7	-1.4	0.5	*4.5	*11.1	*13.7	*14.7	*15.0	*21.1	*21.3	
39.0	110	-7.8			-3.0	-3.2	-0.0	0.0	*4.4	*10.0	*14.4	*14.5	*14.0	*21.6	*21.6	
40.0	110	-4.7				-1.5	-0.7	0.4	*4.4	*10.0	*14.4	*14.5	*14.0	*21.6	*21.6	
41.0	110	-8.9			-4.0	-5.5	-2.2	1.6	*4.0	*11.1	*15.3	*15.7	*17.0	*19.4	*19.4	
42.0	109	-4.5				-3.8	-2.3	1.3	*7.1	*11.2	*18.4	*14.5	*17.4	*17.0	*18.0	
43.0	109	-4.9			-4.0	-4.3	0.1	*3.5	*4.2	*13.5	*16.6	*17.4	*19.3	*20.4	*20.9	
44.0	109	-3.5			-1.0	0.2	1.4	*4.4	*4.6	*14.1	*18.0	*20.4	*22.0	*23.4	*23.7	
45.0	109	-3.0			-2.0	-1.5	0.5	*5.3	*11.6	*17.7	*21.6	*23.5	*24.3	*27.0	*28.0	
46.0	108	-2.3			-2.0	-1.4	0.7	*5.1	*12.4	*18.7	*22.4	*24.5	*26.2	*35.1	*35.3	
47.0	107	-6.5			-2.0	0.2	2.7	*7.3	*14.4	*19.7	*23.4	*26.5	*27.0	*29.7	*29.4	
48.0	101	-6.6			-4.0	-1.0	1.5	0.0	*14.4	*21.6	*25.3	*26.7	*32.0	*35.6	*35.6	
49.0	100	-7.5			-4.0	-2.7	3.3	*9.6	*16.1	*23.5	*27.0	*30.0	*34.1	*34.7	*34.7	
50.0	92	-10.8				-1.0	4.3	*4.4	*17.0	*23.0	*27.0	*30.0	*34.1	*34.7	*34.7	
51.0	80	-1.2				-0.5	2.5	*8.1	*17.1	*24.0	*27.4	*29.0	*35.1	*35.6	*35.7	
52.0	80	-1.7				-1.2	1.0	*4.2	*17.1	*24.2	*28.4	*30.2	*32.2	*33.0	*33.2	
53.0	75	-5.1				-1.3	1.9	*7.0	*16.7	*26.0	*31.4	*35.3	*36.2	*36.4	*36.7	
54.0	73	-0.6				-4.3	-0.4	*6.0	*18.4	*24.4	*28.4	*30.3	*35.3	*36.1	*36.3	
55.0	70	-12.1				-4.4	-1.2	*7.4	*15.5	*23.0	*29.5	*33.0	*35.4	*36.1	*36.3	
56.0	66	-10.4				-1.5	0.7	*6.1	*15.4	*22.4	*29.4	*34.5	*41.5	*42.4	*42.5	
57.0	62	-8.6				-4.4	-1.4	*4.7	*13.4	*23.4	*34.5	*35.6	*42.2	*42.6	*42.6	
58.0	52	-8.9				-4.4	-7.4	*5.4	*12.2	*24.2	*27.4	*30.0	*35.3	*35.7	*35.7	
59.0	40	-20.4				-11.0	3.3	*12.3	*21.3	*25.6	*27.1	*27.4	*29.0	*29.0	*29.0	
60.0	31	-11.7				-5.4	0.0	*0.4	*23.1	*32.4	*37.0	*37.0	*38.2	*38.4	*38.4	
61.0	23	-12.3				-6.4	-2.0	*11.5	*14.7	*22.0	*27.7	*28.1	*28.3	*28.4	*28.4	
62.0	14	-0.8							*2.0	*25.4	*33.4	*33.0	*34.1	*34.2	*34.2	
63.0	6	-11.4							*4.0	*32.0	*32.7	*32.0	*33.0	*33.0	*33.0	
64.0	2	4.4							*0.0	*4.5	*4.4	*4.7	*4.7	*4.7	*4.7	
65.0	2	3.4							*1.0	*16.5	*16.4	*16.0	*16.0	*16.0	*16.0	
66.0	1	-3.4														
67.0	1	-6.8														
68.0	1	-9.7														

DATA SOURCE										JULY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-6.0	-5.9	-3.5	-2.6	-1.5	-0.6	-0.5	-2.3	-3.9	-5.0	-5.9	-7.4	-8.0		
1.0	744	-9.0	-8.9	-6.3	-5.0	-2.9	-0.8	-1.3	-4.4	-6.8	-8.1	-10.8	-17.9	-19.0		
2.0	744	-9.0	-8.9	-5.9	-4.7	-3.6	-1.5	-0.3	-3.3	-6.2	-8.1	-10.7	-13.9	-19.0		
3.0	744	-10.0	-9.9	-6.5	-5.3	-4.0	-2.0	-0.1	-3.1	-5.6	-7.8	-9.5	-11.9	-17.0		
4.0	744	-9.0	-8.7	-6.5	-4.8	-3.6	-2.5	-0.0	-3.2	-6.1	-7.5	-9.6	-13.9	-15.0		
5.0	744	-10.0	-8.9	-7.2	-5.5	-3.0	-0.2	-3.2	-5.9	-7.7	-9.2	-13.4	-18.0			
6.0	744	-10.0	-11.9	-8.9	-7.9	-6.4	-3.5	-0.3	-3.2	-6.3	-8.1	-10.3	-13.9	-18.0		
7.0	744	-12.0	-9.5	-8.0	-6.9	-4.1	-0.4	-3.0	-6.3	-8.2	-10.7	-13.4	-14.0			
8.0	744	-15.0	-14.9	-10.5	-8.8	-7.5	-4.5	-0.5	-2.7	-6.4	-8.7	-10.6	-15.4	-16.0		
9.0	744	-18.0	-15.9	-12.2	-10.5	-8.4	-5.3	-0.8	-3.0	-7.0	-9.6	-12.7	-16.9	-18.0		
10.0	744	-20.0	-19.9	-12.8	-11.2	-9.5	-6.5	-1.4	-2.9	-7.6	-10.6	-12.8	-20.9	-29.0		
11.0	744	-21.0	-19.9	-15.1	-12.6	-10.7	-7.5	-2.2	-3.1	-7.9	-12.1	-14.2	-28.9	-31.0		
12.0	744	-24.0	-23.9	-17.5	-15.1	-12.9	-8.6	-2.7	-2.3	-7.7	-12.7	-17.5	-27.4	-28.0		
13.0	744	-23.0	-22.9	-19.5	-17.6	-14.7	-10.3	-3.9	-1.9	-7.8	-12.6	-19.5	-27.9	-34.0		
14.0	744	-24.0	-22.9	-19.9	-18.1	-14.7	-10.2	-3.9	-1.3	-6.1	-9.6	-15.5	-26.4	-27.0		
15.0	744	-22.0	-17.9	-15.8	-13.9	-11.7	-7.7	-3.0	-1.2	-4.6	-7.4	-10.5	-16.9	-19.0		
16.0	744	-15.0	-14.9	-10.9	-9.6	-7.7	-5.4	-1.4	-1.4	-3.8	-5.3	-6.9	-8.9	-10.0		
17.0	744	-10.0	-9.9	-8.1	-7.0	-6.0	-3.6	-0.6	-1.8	-3.8	-4.9	-5.7	-7.9	-9.0		
18.0	744	-9.0	-7.9	-5.5	-4.6	-3.8	-1.7	-0.0	-2.8	-4.9	-6.3	-7.4	-8.6	-9.0		
19.0	744	-7.0	-5.9	-4.3	-3.6	-2.5	-0.9	-0.9	-3.5	-5.2	-6.0	-6.7	-7.9	-10.0		
20.0	744	-11.0	-6.9	-3.3	-2.2	-1.4	-0.4	-1.5	-3.8	-5.4	-6.9	-8.1	-9.6	-10.0		
21.0	744	-4.0	-3.6	-2.8	-1.6	-0.2	-0.2	-2.2	-5.4	-7.3	-8.5	-9.7	-12.6	-13.0		
22.0	744	-21.0	-4.9	-2.9	-1.8	-1.1	-0.1	-2.8	-6.4	-8.3	-9.5	-10.3	-11.9	-13.0		
23.0	744	-11.0	-10.9	-2.6	-1.8	-0.9	-0.1	-3.3	-6.5	-8.7	-9.6	-10.5	-11.6	-12.0		
24.0	744	-15.0	-5.9	-3.7	-1.3	-0.5	-0.7	-3.6	-6.1	-8.4	-9.6	-10.5	-13.4	-14.0		
25.0	744	-4.0	-3.9	-2.1	-1.2	-0.6	-0.6	-3.4	-6.0	-8.3	-9.6	-10.6	-14.9	-16.0		
26.0	744	-10.0	-6.9	-2.5	-1.4	-0.7	-0.5	-3.4	-6.5	-9.2	-10.2	-11.3	-13.4	-14.0		
27.0	744	-13.0	-10.9	-3.1	-1.9	-0.9	-0.5	-3.3	-6.7	-9.1	-10.5	-11.9	-13.9	-15.0		
28.0	105	-2.1	-1.5	-0.8	-0.4	-0.2	-0.2	-4.5	-6.4	-8.0	-9.0	-10.4	-11.2	-11.3		
29.0	105	-0.9	-0.7	-0.2	-0.1	-0.1	-0.1	-5.9	-7.9	-9.6	-11.4	-12.4	-13.0	-13.0		
30.0	111	-0.9	-1.0	-0.5	-0.1	-0.1	-0.1	-6.7	-10.0	-13.1	-13.0	-14.0	-15.4	-16.5		
31.0	112	-1.9	-1.0	-1.2	-0.1	-0.1	-0.1	-6.1	-11.0	-12.4	-14.7	-15.4	-16.1	-16.5		
32.0	113	-0.8	-0.8	-0.5	-0.3	-0.0	-0.0	-6.7	-10.0	-13.1	-13.0	-14.0	-15.4	-16.5		
33.0	117	-4.2	-3.8	-1.4	-0.1	-0.1	-0.1	-6.1	-11.0	-12.4	-14.7	-15.4	-16.1	-16.5		
34.0	121	-4.4	-1.0	-1.0	-0.7	-0.4	-0.4	-6.6	-11.0	-14.0	-15.0	-15.9	-16.0	-17.0		
35.0	122	-4.3	-2.9	-0.9	-0.3	-0.3	-0.3	-7.4	-10.9	-15.0	-15.4	-16.0	-16.0	-20.1		
36.0	122	-4.7	-2.6	-0.3	-0.3	-0.3	-0.3	-8.4	-12.0	-14.3	-17.1	-17.0	-21.4	-21.9		
37.0	122	-4.5	-6.8	-3.4	-0.0	-0.0	-0.0	-7.8	-11.9	-15.4	-16.7	-17.4	-18.1	-18.4		
38.0	124	-0.2	-4.7	-0.2	-2.3	-2.0	-7.0	-13.1	-15.5	-16.7	-19.3	-19.4	-19.9			
39.0	125	-5.1	-3.0	-0.9	-0.3	-0.3	-0.3	-8.7	-14.0	-18.0	-19.4	-19.0	-21.1	-21.4		
40.0	125	-4.3	-3.0	-3.1	-1.3	-3.8	-4.7	-13.0	-16.3	-19.4	-19.4	-19.4	-23.5	-23.5		
41.0	125	-0.2	-6.7	-3.2	-0.4	-3.0	-0.2	-13.0	-16.0	-18.4	-19.4	-19.4	-24.0	-24.2		
42.0	124	-2.2	-1.0	-0.4	-0.7	-3.4	-4.0	-14.5	-16.4	-19.2	-20.4	-25.1	-25.1			
43.0	124	-4.5	-2.8	-1.7	-0.4	-3.4	-4.0	-14.0	-19.0	-22.0	-23.4	-24.4	-24.4			
44.0	122	-4.3	-3.8	-2.4	-1.3	-5.4	-10.0	-14.0	-21.4	-23.0	-24.4	-24.4	-28.4	-28.7		
45.0	121	-4.2	-4.8	-1.4	-0.1	-5.4	-14.8	-20.0	-25.4	-28.0	-24.0	-30.4	-30.4			
46.0	119	-0.0	-2.0	-2.1	-1.5	-7.4	-16.5	-21.0	-27.0	-29.4	-30.4	-30.4	-35.0	-36.1		
47.0	114	-4.2	-1.0	-1.2	-2.5	-9.4	-14.0	-22.0	-27.0	-29.4	-30.4	-30.4	-35.0	-36.1		
48.0	117	-5.8	-1.0	-1.2	-2.4	-9.4	-14.1	-24.0	-30.0	-33.4	-33.4	-35.0	-35.0			
49.0	115	-5.5	-3.0	-2.4	-3.7	-10.6	-14.0	-24.0	-33.1	-34.4	-35.4	-35.4	-36.0	-37.1		
50.0	113	-1.1	-0.1	-0.4	-3.7	-12.7	-14.7	-24.0	-33.4	-34.0	-36.4	-36.4	-37.0	-37.1		
51.0	110	-4.0	-1.0	-0.6	-6.5	-11.7	-10.3	-25.0	-30.4	-35.4	-36.4	-36.4	-39.7	-39.4		
52.0	104	-4.7	-6.0	-2.4	-3.4	-11.4	-10.0	-26.4	-31.7	-32.4	-36.0	-36.0	-41.0	-42.1		
53.0	103	-7.3	-1.4	-1.4	-2.6	-8.4	-17.4	-27.4	-34.0	-34.0	-36.4	-39.0	-47.1	-47.3		
54.0	97	-15.8	-6.4	-1.1	-1.1	-8.1	-17.4	-24.4	-36.4	-36.4	-40.0	-51.1	-51.7	-51.4		
55.0	89	-14.1	-6.0	-1.5	-1.5	-6.1	-14.5	-29.4	-36.4	-40.0	-41.1	-48.0	-49.1	-52.4		
56.0	84	-19.4	-14.1	-5.9	-5.9	-5.9	-14.4	-27.4	-36.4	-41.1	-48.0	-49.1	-51.4	-51.4		
57.0	77	-24.0	-10.2	-6.4	-5.2	-14.5	-27.0	-34.4	-37.0	-46.0	-46.0	-46.7	-46.7			
58.0	66	-21.7	-8.4	-5.4	-4.4	-14.0	-25.4	-32.4	-35.4	-37.4	-37.4	-38.0	-38.0			
59.0	56	-27.4	-17.7	-14.2	-2.0	-14.0	-24.4	-34.1	-34.0	-35.4	-35.4	-36.1	-36.2			
60.0	41	-30.0	-4.9	-1.7	-1.7	-14.0	-16.4	-30.4	-35.0	-35.4	-35.4	-35.4	-35.4			
61.0	25	-49.8	-6.0	-1.4	-2.6	-8.4	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
62.0	14	-32.0	-1.4	-1.1	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
63.0	11	-1.7	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
64.0	9	2.5	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
65.0	4	0.3	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
66.0	5	4.0	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
67.0	4	-4.1	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
68.0	5	-7.9	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
69.0	5	-12.9	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			
70.0	5	-4.2	-0.4	-0.4	-1.1	-8.1	-17.4	-24.4	-36.4	-40.4	-40.4	-40.4	-40.4			

Positive is wind from the right (165°).
Negative is wind from the left (345°).

DATA SOURCE											AUGUST						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 744	-6.0	-4.9	-3.8	-3.1	-2.4	-1.0		-0.1	-1.5	+3.1	+3.8	+4.8	+6.9	+10.0			
1.0 744	-10.0	-8.9	-6.9	-5.5	-3.9	-1.3		+0.9	+3.6	+5.8	+7.0	+8.5	+12.9	+22.0			
2.0 744	-9.0	-7.9	-6.6	-5.5	-4.3	-1.8		+0.0	+3.1	+4.9	+6.5	+7.9	+12.9	+19.0			
3.0 744	-11.0	-8.9	-6.7	-5.4	-4.4	-2.2	+0.0	+2.9	+5.4	+6.9	+7.8	+12.9	+15.0				
4.0 744	-7.0	-6.5	-5.6	-4.4	-2.4	-0.0	+0.1	+3.1	+5.9	+8.0	+8.9	+10.9	+12.0				
5.0 744	-10.0	-9.9	-7.1	-6.3	-5.0	-2.6	-0.1	+3.4	+6.1	+8.3	+9.9	+12.6	+13.0				
6.0 744	-13.0	-11.9	-8.3	-6.8	-5.5	-3.1	-0.2	+3.1	+6.0	+8.2	+10.2	+14.9	+16.0				
7.0 744	-15.0	-13.9	-9.5	-7.8	-5.9	-3.6	-0.4	+3.3	+6.4	+8.2	+10.3	+13.9	+23.0				
8.0 744	-16.0	-13.9	-10.1	-8.1	-7.1	-4.6	-0.6	+3.1	+6.3	+8.1	+10.5	+14.9	+25.0				
9.0 744	-16.0	-11.9	-11.9	-9.9	-8.3	-5.0	-0.8	+3.2	+6.6	+8.5	+11.7	+16.9	+25.0				
10.0 744	-23.0	-20.9	-14.7	-12.5	-10.4	-6.4	-1.0	+3.7	+7.6	+9.8	+12.6	+24.9	+34.0				
11.0 744	-28.0	-20.9	-19.1	-15.0	-12.5	-7.2	-1.1	+3.8	+8.6	+11.6	+15.5	+29.9	+35.0				
12.0 744	-31.0	-28.9	-22.1	-17.6	-13.5	-8.3	-2.0	+3.7	+9.6	+14.0	+17.5	+30.9	+36.0				
13.0 744	-28.0	-27.9	-22.5	-18.4	-14.6	-9.9	-2.9	+3.2	+9.1	+13.3	+18.5	+24.9	+31.0				
14.0 744	-26.0	-24.9	-18.6	-16.1	-13.5	-8.7	-2.6	+1.6	+6.7	+10.3	+15.5	+21.9	+23.0				
15.0 744	-16.0	-15.9	-11.7	-9.8	-8.8	-6.4	-1.8	+1.3	+4.9	+7.5	+10.5	+13.9	+16.0				
16.0 744	-10.0	-8.9	-7.2	-5.9	-4.0	-0.8	-1.8	+3.9	+5.6	+6.7	+9.9	+12.0					
17.0 744	-8.0	-7.9	-6.0	-5.3	-4.2	-2.5	-0.2	+2.4	+4.5	+5.8	+6.7	+7.9	+12.0				
18.0 744	-7.0	-6.9	-4.9	-4.0	-2.9	-1.3	+0.3	+3.3	+4.8	+6.2	+6.9	+8.9	+15.0				
19.0 744	-5.0	-4.9	-3.8	-2.9	-1.8	-0.7	+1.1	+3.5	+5.6	+6.6	+7.5	+8.7	+9.0				
20.0 744	-6.0	-5.9	-3.1	-2.3	-1.3	-0.2	+2.0	+4.1	+5.6	+6.7	+7.7	+9.6	+10.0				
21.0 744	-5.0	-3.9	-2.6	-1.8	-0.9	-0.1	+2.6	+5.1	+6.8	+7.7	+8.6	+9.9	+11.0				
22.0 744	-4.0	-3.9	-2.8	-1.8	-1.0	+0.1	+3.1	+5.8	+7.7	+8.7	+9.5	+10.9	+12.0				
23.0 744	-7.0	-5.9	-1.8	-1.2	-0.7	+0.4	+3.4	+6.2	+8.4	+9.4	+10.6	+11.8	+12.0				
24.0 744	-6.0	-5.9	-1.7	-0.9	-0.5	+0.7	+3.5	+6.3	+8.1	+9.0	+10.7	+12.9	+15.0				
25.0 744	-5.0	-4.9	-1.9	-0.9	-0.4	+0.7	+3.5	+6.4	+8.3	+9.4	+10.3	+11.9	+13.0				
26.0 744	-7.0	-8.9	-2.6	-1.7	-0.8	+0.4	+3.3	+6.1	+7.9	+9.3	+10.5	+11.9	+13.0				
27.0 744	-4.0	-3.9	-2.3	-1.6	-0.8	+0.2	+3.0	+5.9	+8.7	+9.8	+10.7	+12.9	+15.0				
28.0 110	-0.9	-0.9	-0.5	-0.5	-0.5	1.8	4.7	7.9	10.1	10.0	11.0	13.0	13.4				
29.0 113	-0.0	-0.0	-0.0	-0.0	-0.0	1.5	5.1	8.1	10.5	12.7	13.0	17.0	17.4				
30.0 113	-17.0	-2.0	-1.7	-0.5	2.0	5.7	0.2	10.4	11.0	12.5	13.0	13.0	13.1				
31.0 115	-5.3	-3.0	-2.4	-1.1	2.4	6.4	10.4	13.1	13.0	14.0	15.0	16.0	16.1				
32.0 115	-9.1	-2.0	-1.6	-0.8	2.1	4.5	10.0	12.5	15.0	16.0	16.0	30.1	30.1				
33.0 115	-0.0	-1.0	-0.4	0.7	3.0	6.4	10.5	11.0	13.0	13.0	23.0	24.1					
34.0 117	-0.9	-3.4	-2.7	-0.1	2.4	4.5	10.5	14.6	14.4	14.4	24.4	31.6	31.6				
35.0 114	-7.3	-6.8	-5.4	-2.7	1.4	4.0	11.3	15.0	15.0	15.7	17.0	19.7	19.4				
36.0 114	-13.3	-4.8	-3.4	-0.8	1.4	4.8	11.4	14.0	14.0	14.0	17.4	18.0	19.1				
37.0 120	-5.8	-5.4	-5.0	1.4	7.5	12.7	14.3	14.3	15.4	17.2	17.4	17.4					
38.0 120	-11.4	-5.8	-2.6	-1.6	1.0	9.1	12.0	15.0	16.4	17.6	18.4	19.4					
39.0 120	-6.5	-6.0	-0.4	-1.5	2.4	8.1	12.0	15.0	17.1	17.0	19.0	20.1					
40.0 119	-6.5	-4.0	-0.0	-1.4	6.4	13.0	13.0	17.1	19.1	19.0	20.6	20.7					
41.0 117	-7.7	-6.8	-5.4	-3.7	-0.1	4.9	12.5	16.7	14.0	14.0	21.6	21.6					
42.0 117	-17.8	-6.8	-3.7	-1.4	1.1	7.1	12.4	17.1	14.0	14.0	20.1	20.1					
43.0 117	-5.7	-5.6	-2.7	-1.1	2.4	4.5	14.4	19.1	20.0	20.0	22.1	22.5					
44.0 115	-7.0	-6.7	-1.6	4.1	9.7	15.7	20.4	20.4	20.0	26.0	29.7	29.4					
45.0 114	-6.6	-6.0	-5.5	0.2	3.7	11.0	14.0	21.0	24.0	24.7	26.0	34.1	34.3				
46.0 113	-8.9	-8.7	-7.0	-0.4	4.4	14.2	20.0	24.0	24.0	24.0	29.0	32.4	32.9				
47.0 110	-6.4	-6.0	-5.0	-1.5	4.7	13.6	20.6	27.1	27.0	36.0	41.4	41.9					
48.0 110	-5.7	-5.7	-2.7	-0.5	5.2	13.4	21.6	25.5	27.7	31.0	41.7	41.9					
49.0 104	-15.4	-0.0	-0.4	-0.4	1.6	12.7	22.0	26.4	27.0	29.0	37.0	37.1					
50.0 105	-14.3	-8.0	-5.6	-3.9	4.1	11.4	21.4	24.0	30.0	31.0	40.4	40.9					
51.0 105	-15.3	-10.0	-9.4	-4.7	6.2	12.5	22.0	27.4	34.4	39.0	41.0	41.5					
52.0 98	-0.2	-7.0	-4.1	4.4	12.0	12.0	32.1	34.0	40.0	40.0	61.0	62.0					
53.0 94	-13.3	-9.4	-2.2	3.7	11.2	20.0	31.0	31.0	32.0	61.0	61.0	62.0					
54.0 91	-13.5	-7.0	-3.2	2.4	11.1	21.4	24.0	24.0	29.0	72.1	72.4	72.7					
55.0 83	-27.9	-13.1	-5.0	2.4	10.5	19.3	24.0	32.1	32.1	73.0	73.0	74.0					
56.0 75	-14.2	-12.4	-10.4	-0.6	10.5	19.5	27.4	35.4	49.4	50.1	50.2						
57.0 61	-21.6	-16.6	-11.9	-1.4	10.8	19.7	33.0	37.4	38.4	39.0	39.1						
58.0 44	-19.3	-13.0	-11.6	-2.2	9.5	24.4	35.4	37.0	42.4	43.4	43.5						
59.0 37	-22.0	-14.1	-11.1	-1.1	11.3	23.1	34.1	34.0	39.1	39.4	39.4						
60.0 27	-25.7	-18.6	-14.6	1.4	14.2	37.7	37.7	51.4	52.0	52.4	52.4						
61.0 27	-21.1	-14.6	-5.7	13.4	24.7	42.4	42.4	42.4	43.0	43.0	43.1						
62.0 19	-11.2	-2.0	4.4	24.0	40.0	40.0	40.0	40.0	40.7	40.4	40.4						
63.0 16	-5.4	-3.5	11.0	21.7	25.4	25.0	26.4	26.4	26.4	26.4	26.5						
64.0 10	-10.2	-2.4	5.0	27.4	30.7	31.1	31.1	31.1	31.1	31.4	31.4						
65.0 4	-5.9	1.4	5.0	12.7	24.4	24.4	24.4	24.4	24.4	24.4	24.4						
66.0 7	-1.3	0.1	0.5	14.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0						
67.0 4	-1.6	1.4	14.0	15.1	15.4	15.4	15.4	15.4	15.4	15.4	15.4						
68.0 4	-7.5	4.0	15.5	16.7	16.7	16.7	16.4	16.4	16.4	16.4	16.4						
69.0 4	3.7	5.0	27.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0						
70.0 4	-0.7																

Positive is wind from the right (165°).
Negative is wind from the left (345°).

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH TABLE 9.9

DATA SOURCE							SEPTEMBER										
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-12.0		-7.9	-6.1	-4.4		-2.0	-0.3	+1.3	+3.0	+4.2	+5.9	+9.0	+10.0		
1.0	720	-29.0		-11.6	-8.9	-6.4		-3.1	-0.0	+3.9	+7.6	+9.9	+11.9	+25.0	+26.0		
2.0	720	-30.0		-10.8	-7.9	-5.7		-3.2	-0.2	+3.5	+7.1	+9.5	+12.4	+30.0	+31.0		
3.0	720	-28.0		-10.5	-8.1	-5.9	-3.2	-0.3	+3.4	+6.2	+8.6	+12.8	+31.0	+32.0			
4.0	720	-24.0		-9.4	-7.9	-5.9	-3.3	-0.4	+3.1	+6.9	+8.6	+11.4	+29.0	+30.0			
5.0	720	-23.0		-9.9	-8.4	-6.4	-3.8	-0.5	+3.2	+6.6	+9.5	+11.9	+25.0	+26.0			
6.0	720	-22.0		-11.8	-9.4	-7.6	-4.6	-0.6	+3.1	+6.8	+10.8	+12.4	+25.0	+26.0			
7.0	720	-20.0		-13.3	-11.1	-8.5	-4.7	-0.6	+3.6	+7.7	+10.1	+12.4	+27.0	+28.0			
8.0	720	-22.0		-14.5	-11.9	-9.0	-5.1	-0.8	+3.8	+8.3	+10.2	+12.9	+26.0	+27.0			
9.0	720	-25.0		-15.9	-13.2	-10.0	-6.4	-0.9	+4.3	+9.0	+11.6	+13.7	+18.0	+19.0			
10.0	720	-27.0		-17.9	-15.3	-12.9	-7.9	-1.4	+4.7	+9.2	+12.5	+14.7	+25.0	+26.0			
11.0	720	-29.0		-20.7	-17.7	-15.1	-9.3	-1.7	+4.5	+11.0	+14.2	+16.4	+20.0	+21.0			
12.0	720	-36.0		-25.7	-23.2	-18.5	-11.1	-2.4	+4.9	+10.3	+14.3	+17.8	+21.0	+22.0			
13.0	720	-40.0		-29.7	-24.7	-20.0	-12.2	-2.8	+4.9	+10.0	+13.5	+16.3	+20.0	+21.0			
14.0	720	-40.0		-28.8	-24.6	-19.5	-11.5	-3.2	+3.8	+9.3	+12.2	+16.9	+25.0	+26.0			
15.0	720	-26.0		-21.3	-18.5	-14.5	-9.2	-2.6	+2.3	+7.1	+10.5	+14.8	+31.0	+32.0			
16.0	720	-17.0		-13.4	-11.9	-10.0	-6.3	-1.8	+1.5	+5.5	+7.7	+9.6	+18.0	+19.0			
17.0	720	-14.0		-9.1	-7.9	-6.5	-4.2	-0.7	+1.9	+4.4	+5.9	+7.7	+12.0	+13.0			
18.0	720	-6.0		-6.6	-5.8	-4.7	-2.6	-0.3	+2.1	+4.2	+5.5	+6.6	+8.6	+9.0			
19.0	720	-7.0		-4.7	-3.9	-3.3	-1.5	-0.0	+2.5	+4.2	+5.1	+5.7	+10.0	+11.0			
20.0	720	-5.0		-4.9	-3.4	-2.4	-0.8	+0.6	+2.9	+4.5	+5.5	+6.2	+11.0	+12.0			
21.0	720	-5.0		-3.4	-2.6	-1.8	-0.8	+1.2	+4.0	+5.7	+6.5	+6.9	+11.5	+12.0			
22.0	720	-7.0		-3.6	-2.5	-1.5	-0.5	+1.5	+4.1	+6.1	+7.3	+8.2	+12.0	+13.0			
23.0	720	-10.0		-3.5	-2.5	-1.4	-0.3	+1.8	+4.2	+5.8	+6.6	+7.7	+11.0	+12.0			
24.0	720	-9.0		-4.1	-2.6	-1.5	-0.4	+1.7	+4.3	+6.0	+6.8	+7.6	+9.5	+10.0			
25.0	720	-14.0		-3.8	-2.7	-1.7	-0.5	+1.6	+4.4	+6.5	+7.7	+9.1	+11.0	+12.0			
26.0	720	-5.0		-3.7	-2.9	-1.8	-0.6	+1.3	+4.0	+6.5	+7.8	+8.8	+12.0	+13.0			
27.0	720	-15.0		-4.9	-3.7	-2.8	-0.8	+1.4	+4.4	+6.9	+8.1	+9.4	+12.0	+13.0			
28.0	105	-6.8		-4.0	-3.6	-1.8	-0.2	2.3	5.4	7.4	9.6	11.0	14.3	15.5			
29.0	107	-5.0		-2.0	-1.0	-1.5	0.0	2.4	5.1	8.0	10.8	11.0	14.2	15.5			
30.0	104	-7.1		-5.0	-4.5	-2.4	-0.0	2.3	5.6	9.8	14.6	15.0	18.2	19.0			
31.0	109	-6.5		-4.0	-3.5	-1.0	0.2	3.2	7.7	9.7	11.0	12.0	14.8	15.0			
32.0	104	-13.8		-5.0	-4.5	-2.5	-0.6	3.5	8.4	10.4	13.6	15.0	18.1	19.0			
33.0	104	-5.0		-4.4	-3.3	-0.1	3.6	9.1	10.4	11.8	13.0	15.0	15.1	15.5			
34.0	109	-7.3		-6.0	-5.5	-3.5	-1.4	2.0	7.6	10.2	11.6	12.0	13.5	13.5			
35.0	104	-13.6		-10.0	-6.5	-4.6	-1.7	2.8	8.1	10.3	10.0	11.0	14.4	14.5			
36.0	104	-12.7		-7.0	-6.8	-5.6	-2.5	2.3	7.8	10.5	16.3	17.0	19.4	19.5			
37.0	107	-13.4		-8.0	-6.8	-5.3	-2.4	2.1	6.9	12.2	14.6	15.0	23.0	24.1			
38.0	106	-8.6		-8.6	-7.8	-6.4	-2.4	2.0	7.8	9.6	9.0	19.0	25.2	25.3			
39.0	106	-11.9		-11.8	-10.4	-8.0	-3.8	3.0	7.8	10.9	16.6	17.0	19.8	19.9			
40.0	106	-16.6		-9.0	-8.8	-6.0	-3.0	3.1	8.4	11.9	14.6	16.0	21.7	21.8			
41.0	102	-14.4		-10.0	-10.7	-7.0	-3.8	2.0	9.3	12.6	15.7	17.0	19.0	19.0			
42.0	102	-13.6		-13.0	-10.0	-6.5	-2.3	0.5	14.5	16.0	20.7	21.4	21.5				
43.0	100	-12.2			-10.0	-6.1	3.0	0.0	9.0	16.5	20.7	24.0	24.8	24.0			
44.0	94	-18.2			-12.7	-11.0	-3.8	4.2	13.2	15.7	16.0	26.0	26.9	27.0			
45.0	95	-15.9			-11.0	-11.1	-4.2	4.4	11.2	17.3	20.8	22.0	22.5	22.5			
46.0	94	-11.1			-10.9	-7.4	-3.0	4.7	10.5	19.2	23.0	34.1	39.0	39.2			
47.0	84	-12.3			-9.0	-5.7	-0.1	4.7	11.5	17.0	28.0	27.2	24.3	24.5			
48.0	85	-10.1			-7.1	-5.0	-1.2	5.3	11.5	16.2	22.1	23.1	23.4	23.7			
49.0	81	-12.5			-9.6	-6.4	-1.0	6.3	12.3	17.0	20.4	21.2	22.1	22.5			
50.0	81	-10.8			-5.0	-1.1	6.1	12.6	19.5	25.1	25.7	26.1	26.2				
51.0	76	-7.5			-6.1	-2.3	7.0	12.5	17.7	19.6	32.2	32.2	32.9	33.0			
52.0	66	-13.1			-10.5	-4.7	-1.5	7.8	13.0	17.7	20.6	29.5	30.2	30.3			
53.0	61	-13.4			-7.6	-6.5	-1.2	8.3	14.7	20.5	21.6	25.2	25.6	25.6			
54.0	58	-14.4			-11.7	-7.1	-1.6	7.8	15.4	22.1	24.7	26.4	26.8	26.9			
55.0	55	-13.9			-13.7	-9.2	-2.4	5.2	15.1	22.3	23.7	30.5	31.1	31.1			
56.0	46	-15.2			-13.0	-11.7	-1.7	4.3	13.7	16.0	21.0	31.7	32.2	32.3			
57.0	37	-15.1				-9.1	-3.1	3.5	13.1	19.2	24.9	24.0	25.4	25.4			
58.0	31	-19.8			-14.4	-8.1	-4.3	4.3	15.0	20.5	28.1	28.4	28.5	28.5			
59.0	20	-13.0			-13.0	-1.8	5.0	0.0	9.9	16.0	22.6	22.0	23.1	23.1			
60.0	12	-24.9				-6.1	3.5	8.0	8.6	8.6	8.7	8.7	8.7	8.7			
61.0	8	-39.8				-6.7	2.0	8.7	12.6	12.0	12.0	13.0	13.0				
62.0	6	-56.8					-3.0	7.0	7.4	7.4	7.4	7.4	7.4	7.4			
63.0	6	-74.1					-12.0	2.0	2.4	2.4	2.4	2.4	2.4	2.4			
64.0	2	-6.7					-6.0	13.4	13.5	13.5	13.5	13.5	13.5	13.5			
65.0	1	-41.5															
66.0	1	-54.2															
67.0	1	-40.4															
68.0	1	-32.1															
69.0	1	-19.7															
70.0	1	-1.1															

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	CUMULATIVE PERCENTAGE FREQUENCY										MAX SPEED (DEG)	DIR (DEG)	
5FC	744	-12.0	-11.9	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
1.0	744	-17.0	-15.9	-9.1	-7.7	-5.6	-3.5	-1.1	-0.9	-2.4	-3.5	-4.6	-5.9	-8.0		
2.0	744	-16.0	-12.2	-13.5	-11.5	-8.3	-5.0	-1.1	-2.5	-6.3	-8.2	-9.3	-12.9	-14.0		
3.0	744	-13.0	-11.9	-12.2	-9.7	-8.1	-4.7	-0.8	-2.7	-5.4	-7.7	-9.6	-12.4	-13.0		
4.0	744	-16.0	-11.9	-10.0	-8.4	-4.9	-0.9	-2.8	-6.7	-8.4	-9.7	-11.9	-13.0			
5.0	744	-20.0	-12.1	-11.1	-8.9	-5.4	-1.0	-3.2	-6.8	-8.7	-9.9	-11.6	-12.0			
6.0	744	-22.0	-18.9	-13.8	-12.0	-10.0	-6.4	-1.6	-3.2	-6.9	-9.2	-10.5	-13.9	-15.0		
7.0	744	-26.0	-20.9	-15.7	-13.5	-11.9	-7.6	-1.7	-4.1	-6.9	-9.4	-11.7	-15.4	-16.0		
8.0	744	-28.0	-24.9	-19.2	-16.7	-13.6	-8.8	-1.9	-4.0	-7.9	-10.6	-13.1	-16.6	-17.0		
9.0	744	-37.0	-28.0	-23.5	-19.0	-15.8	-10.4	-2.3	-4.1	-9.0	-11.5	-15.5	-20.9	-29.0		
10.0	744	-37.0	-33.9	-25.2	-22.1	-19.1	-11.8	-2.8	-4.9	-11.4	-15.0	-19.2	-26.9	-28.0		
11.0	744	-52.0	-35.9	-31.3	-26.4	-22.7	-14.1	-2.9	-5.9	-14.3	-19.0	-23.5	-34.9	-36.0		
12.0	744	-54.0	-47.9	-35.8	-32.0	-26.6	-16.5	-3.3	-7.0	-16.1	-21.0	-27.1	-34.9	-39.0		
13.0	744	-54.0	-44.9	-38.8	-33.6	-29.2	-18.1	-3.8	-6.9	-16.3	-23.2	-27.1	-33.4	-34.0		
14.0	744	-52.0	-40.9	-34.9	-32.7	-28.3	-18.1	-4.8	-5.3	-12.6	-18.0	-21.3	-25.9	-28.0		
15.0	744	-41.0	-39.9	-35.2	-28.7	-24.7	-15.4	-4.6	-2.4	-8.4	-12.5	-14.8	-21.4	-22.0		
16.0	744	-35.0	-26.8	-22.7	-19.7	-17.2	-12.2	-4.1	-1.5	-6.4	-8.5	-11.1	-14.9	-18.0		
17.0	744	-30.0	-27.9	-21.5	-19.1	-14.7	-8.9	-2.9	-0.9	-4.8	-6.7	-9.1	-10.9	-13.0		
18.0	744	-19.0	-18.9	-13.7	-11.8	-9.8	-6.5	-1.8	-1.1	-3.7	-5.4	-7.5	-10.9	-15.0		
19.0	744	-15.0	-13.9	-9.1	-8.0	-6.6	-4.3	-1.1	-0.9	-2.7	-4.3	-6.2	-15.9	-17.0		
20.0	744	-9.0	-7.8	-6.6	-5.6	-4.5	-2.5	-0.7	-1.4	-3.2	-4.7	-5.9	-8.9	-16.0		
21.0	744	-9.0	-7.9	-5.9	-4.9	-4.0	-2.4	-0.3	-2.0	-3.6	-4.3	-4.9	-8.9	-10.0		
22.0	744	-10.0	-6.9	-5.7	-4.4	-3.4	-2.4	-0.3	-1.9	-3.8	-4.5	-6.1	-7.9	-9.0		
23.0	744	-9.0	-8.9	-6.5	-5.4	-3.9	-2.3	-0.2	-2.2	-3.9	-5.1	-6.1	-7.9	-9.0		
24.0	744	-12.0	-9.9	-6.7	-5.1	-3.9	-2.1	-0.2	-2.3	-4.2	-5.3	-6.1	-9.9	-14.0		
25.0	744	-10.0	-7.2	-6.6	-4.7	-2.5	-0.3	-2.3	-4.2	-5.5	-6.7	-8.9	-10.0			
26.0	744	-12.0	-10.9	-7.9	-5.6	-3.5	-3.0	-0.4	-1.9	-3.8	-5.0	-5.8	-7.7	-8.0		
27.0	744	-10.0	-8.7	-7.4	-5.9	-3.6	-0.7	-1.9	-3.7	-4.6	-5.5	-7.9	-11.0	-11.0		
28.0	74	-6.2	-7.4	-6.1	-4.1	-3.7	-2.3	1.0	4.7	7.0	7.7	13.2	13.4	13.9		
29.0	82	-4.7	-6.9	-6.1	-4.1	-3.7	-2.3	0.7	3.9	6.5	8.1	9.1	9.7	9.4		
30.0	84	-7.7	-6.9	-6.9	-3.2	-3.7	0.7	3.6	5.3	8.1	10.1	10.7	10.4	10.4		
31.0	85	-11.4	-8.5	-7.4	-3.0	0.7	4.8	7.4	9.4	11.1	11.1	11.7	11.4	11.4		
32.0	90	-10.1	-9.5	-7.4	-4.0	0.1	4.0	9.4	11.0	13.1	13.1	13.4	13.7	13.7		
33.0	90	-10.5	-10.1	-6.7	-6.1	-0.9	4.5	7.5	10.4	10.4	10.4	10.4	10.4	10.4		
34.0	90	-14.7	-14.0	-10.0	-8.2	-2.4	2.0	4.4	6.4	6.4	7.1	7.7	7.4	7.4		
35.0	90	-16.1	-16.0	-14.2	-9.7	-4.3	1.2	4.3	5.4	5.4	7.1	8.2	8.4	8.4		
36.0	91	-15.5	-14.0	-13.1	-10.7	-5.2	0.5	3.7	5.0	7.1	7.1	8.3	8.4	8.4		
37.0	90	-19.2	-15.0	-13.6	-10.2	-5.2	0.1	4.5	5.4	6.1	6.1	9.4	9.4	9.4		
38.0	89	-22.6	-14.0	-12.0	-11.0	-5.1	1.9	4.5	5.0	6.1	6.1	9.4	9.4	9.4		
39.0	94	-17.9	-15.0	-11.0	-10.4	-3.7	2.4	5.3	9.0	11.5	11.5	11.0	12.0	12.0		
40.0	95	-20.4	-14.8	-12.4	-10.0	-4.0	2.5	6.1	7.4	11.0	11.0	11.4	12.0	12.0		
41.0	94	-24.5	-20.0	-15.3	-9.7	-4.5	4.2	7.7	11.0	12.1	12.1	12.4	12.9	12.9		
42.0	97	-26.7	-23.8	-15.1	-9.6	-4.8	2.3	7.7	8.0	12.0	12.0	13.0	13.2	13.2		
43.0	97	-28.0	-19.4	-17.1	-10.4	-3.9	4.2	7.1	7.0	12.0	12.0	12.7	12.4	12.4		
44.0	94	-27.7	-19.4	-16.6	-10.1	-2.7	4.2	10.3	17.0	15.1	15.1	14.2	14.4	14.4		
45.0	92	-27.3	-17.0	-15.4	-9.6	-3.3	3.0	10.2	11.0	15.7	15.7	15.2	15.3	15.3		
46.0	93	-23.2	-17.0	-16.1	-10.1	-2.0	4.3	9.4	10.0	14.1	14.1	14.7	14.7	14.7		
47.0	91	-23.5	-20.0	-17.5	-10.1	-3.0	5.7	11.2	12.0	14.1	14.1	15.2	15.3	15.3		
48.0	89	-25.6	-19.0	-14.3	-10.0	-3.9	5.7	10.3	11.6	12.1	12.1	13.1	13.3	13.3		
49.0	86	-31.9	-27.0	-17.3	-11.3	-2.7	5.4	9.2	10.4	12.1	12.1	12.0	13.1	13.1		
50.0	84	-29.6	-25.1	-20.4	-10.0	-3.0	4.1	7.4	9.1	14.1	14.1	14.4	14.7	14.7		
51.0	79	-28.9	-22.2	-19.5	-9.0	-2.1	3.5	6.7	8.2	9.1	9.1	9.4	9.4	9.4		
52.0	75	-27.7	-20.3	-17.2	-12.0	-3.4	2.4	5.4	8.4	12.2	12.2	12.7	12.4	12.4		
53.0	70	-18.8	-18.7	-17.7	-13.4	-4.2	2.3	6.4	11.4	15.3	15.3	15.4	15.9	15.9		
54.0	63	-22.2	-20.4	-17.4	-12.4	-5.4	1.0	4.0	5.0	14.2	14.2	14.4	14.4	14.4		
55.0	57	-21.1	-20.7	-19.1	-15.0	-6.2	0.0	5.2	6.7	9.2	9.2	9.4	9.4	9.4		
56.0	44	-20.2	-19.4	-15.7	-15.7	-8.0	-2.1	1.3	2.0	3.7	3.7	4.3	4.4	4.4		
57.0	40	-23.8	-23.0	-17.4	-17.4	-8.7	-0.3	3.0	3.0	3.6	3.6	3.4	3.4	3.4		
58.0	34	-27.2	-23.4	-20.4	-20.4	-11.4	1.3	7.3	11.2	11.5	11.5	11.4	11.4	11.4		
59.0	27	-25.5	-21.0	-19.2	-19.2	-8.7	1.2	9.7	26.3	26.3	26.3	26.7	26.7	26.7		
60.0	22	-24.5	-20.4	-20.4	-20.4	-8.0	-0.2	21.0	24.7	29.1	29.1	29.4	29.4	29.4		
61.0	14	-30.5	-22.9	-22.9	-22.9	-11.0	-2.1	32.3	39.4	39.4	39.4	32.4	32.4	32.4		
62.0	4	-20.3	-19.0	-19.0	-19.0	-8.4	0.4	0.4	1.0	1.1	1.1	1.1	1.1	1.1		
63.0	2	-19.7	-20.0	-18.0	-18.0	-17.7	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6		
64.0	1	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0		
65.0	1	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3		
66.0	1	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7		
67.0	1	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2		
68.0	1	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6		
69.0	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
70.0	1	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4		

Positive is wind from the right (165°).
Negative is wind from the left (345°).

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH TABLE 9.11

DATA SOURCE											NOVEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
SFC	720	-11.0			-8.9	-7.7	-6.4	-4.0	-0.9	+0.8	+2.5	+3.5	+4.4	+6.5	+7.0	
1.0	720	-21.0			-12.7	-10.9	-9.4	-5.5	-0.7	+3.1	+6.6	+8.6	+10.8	+19.0	+20.0	
2.0	720	-20.0			-13.5	-11.2	-9.5	-5.6	-0.8	+2.9	+5.8	+8.3	+9.6	+13.0	+14.0	
3.0	720	-19.0			-14.3	-11.9	-9.8	-6.6	-1.4	+2.1	+5.7	+7.8	+10.8	+15.5	+16.0	
4.0	720	-24.0			-15.9	-13.7	-11.3	-7.7	-2.0	+1.9	+5.6	+7.8	+11.8	+18.0	+19.0	
5.0	720	-23.0			-18.3	-16.1	-13.4	-9.1	-2.7	+1.6	+5.8	+8.4	+13.2	+20.0	+21.0	
6.0	720	-30.0			-20.9	-18.3	-15.1	-10.4	-3.6	+1.0	+6.6	+11.3	+18.4	+20.5	+21.0	
7.0	720	-33.0			-24.3	-20.9	-17.6	-12.4	-4.3	+1.3	+7.8	+12.7	+21.8	+25.0	+26.0	
8.0	720	-42.0			-31.7	-25.3	-20.0	-14.3	-5.1	+1.3	+8.2	+14.8	+20.6	+36.0	+37.0	
9.0	720	-47.0			-32.8	-26.3	-23.0	-16.5	-5.6	+1.7	+11.1	+15.8	+20.7	+45.0	+46.0	
10.0	720	-53.0			-36.7	-31.8	-27.5	-18.1	-6.3	+2.4	+10.0	+16.5	+23.4	+54.0	+55.0	
11.0	720	-56.0			-40.7	-36.5	-31.3	-20.9	-7.3	+2.7	+11.1	+19.5	+26.9	+58.0	+59.0	
12.0	720	-48.0			-40.6	-36.2	-31.3	-22.7	-8.6	+3.1	+11.1	+17.6	+26.8	+69.0	+70.0	
13.0	720	-49.0			-37.7	-33.4	-29.1	-20.7	-9.2	+2.1	+11.0	+16.5	+23.4	+67.0	+68.0	
14.0	720	-43.0			-33.5	-31.0	-24.3	-18.3	-8.4	+0.8	+7.5	+12.1	+18.4	+52.0	+53.0	
15.0	720	-37.0			-29.3	-24.5	-21.0	-15.6	-6.9	-0.1	+5.2	+9.5	+12.4	+41.0	+42.0	
16.0	720	-29.0			-25.3	-20.4	-17.6	-12.7	-5.9	-0.0	+4.6	+7.2	+12.9	+28.0	+29.0	
17.0	720	-27.0			-21.4	-18.3	-15.0	-10.3	-4.6	+0.3	+4.5	+6.7	+9.9	+39.0	+40.0	
18.0	720	-20.0			-15.4	-13.6	-11.5	-7.8	-3.1	+0.3	+3.9	+5.8	+8.2	+19.0	+20.0	
19.0	720	-13.0			-12.7	-9.9	-8.3	-5.8	-2.1	+1.0	+3.2	+4.6	+7.4	+13.0	+14.0	
20.0	720	-12.0			-8.9	-7.6	-6.5	-4.5	-1.4	+0.9	+3.3	+4.9	+6.3	+18.0	+19.0	
21.0	720	-17.0			-8.2	-6.5	-5.5	-3.6	-0.9	+1.0	+3.1	+4.3	+5.3	+10.5	+11.0	
22.0	720	-12.0			-8.9	-7.4	-6.0	-3.7	-0.7	+1.3	+3.0	+4.4	+4.9	+11.0	+12.0	
23.0	720	-12.0			-8.3	-7.3	-5.8	-3.7	-0.8	+1.6	+3.6	+4.8	+5.9	+7.0	+8.0	
24.0	720	-13.0			-9.5	-7.5	-6.1	-4.0	-0.9	+1.5	+3.7	+5.3	+7.1	+10.0	+11.0	
25.0	720	-17.0			-11.8	-8.8	-7.0	-4.7	-1.3	+1.3	+4.0	+5.5	+7.2	+11.5	+12.0	
26.0	720	-14.0			-10.7	-9.4	-8.3	-5.4	-1.9	+1.2	+4.2	+5.8	+7.6	+12.0	+13.0	
27.0	720	-15.0			-11.6	-10.3	-8.7	-6.0	-2.1	+1.2	+4.7	+6.9	+10.2	+15.0	+16.0	
28.0	80	-10.0			-10.0	-8.5	-7.6	-4.6	-0.1	5.5	10.5	14.4	16.1	15.7	16.8	
29.0	90	-14.4			-10.0	-9.2	-8.0	-4.9	-0.1	3.7	8.4	11.0	26.1	27.0	27.1	
30.0	90	-12.7			-12.0	-10.2	-8.4	-4.8	-0.1	5.2	10.2	11.0	15.1	16.2	16.3	
31.0	91	-16.3			-14.5	-10.7	-8.5	-5.5	-0.7	4.2	8.5	9.4	9.7	10.0	10.1	
32.0	91	-14.9			-13.0	-12.1	-7.1	-1.7	-1.7	3.5	6.4	7.4	11.1	11.7	11.4	
33.0	92	-18.5			-15.0	-14.2	-8.6	-1.1	3.2	7.2	9.0	12.0	12.0	12.5	12.5	
34.0	92	-19.2			-16.0	-14.8	-10.1	-3.3	3.5	7.5	8.0	13.1	14.4	14.4		
35.0	92	-19.1			-17.0	-15.5	-11.4	-3.4	2.2	10.4	12.4	21.1	22.1	22.2		
36.0	90	-23.0			-14.7	-16.5	-11.7	-7.1	0.0	8.3	13.5	22.1	21.7	23.4		
37.0	91	-24.7			-14.0	-17.5	-12.9	-4.7	1.6	9.2	12.0	20.1	21.0	21.2		
38.0	95	-24.7			-20.8	-18.4	-14.0	-5.3	2.0	9.4	14.8	20.0	20.8	20.9		
39.0	94	-24.7			-21.0	-19.3	-13.0	-4.7	3.0	9.3	13.0	20.1	20.0	21.0		
40.0	93	-33.4			-24.0	-21.2	-13.4	-4.0	3.4	10.7	12.0	14.1	14.4	14.7		
41.0	93	-33.0			-27.4	-25.2	-14.4	-4.4	3.4	9.4	10.0	16.1	16.6	16.7		
42.0	93	-29.8			-27.0	-24.3	-11.2	-3.0	3.0	9.7	11.0	14.7	15.1	15.4		
43.0	92	-26.0			-25.0	-24.1	-12.1	-2.7	5.4	10.5	15.0	22.1	23.0	23.1		
44.0	84	-23.4			-21.5	-19.6	-11.4	-1.7	4.8	18.2	19.0	21.1	21.0	22.1		
45.0	87	-35.0			-19.0	-18.2	-9.2	-2.2	9.2	19.7	24.0	28.1	28.4	28.9		
46.0	86	-20.7			-19.0	-15.3	-9.0	-3.0	12.4	21.7	30.0	31.1	31.0	32.0		
47.0	83	-22.9			-21.1	-17.4	-9.0	-1.5	13.0	24.4	29.1	39.2	40.1	40.2		
48.0	82	-27.8			-18.1	-16.4	-11.0	-1.5	14.0	21.5	23.1	23.7	24.0	24.1		
49.0	85	-24.2			-19.4	-19.2	-13.4	0.5	14.5	20.4	24.1	29.2	30.2	30.4		
50.0	84	-29.8			-27.1	-22.4	-17.7	-1.5	9.9	19.4	20.7	21.2	22.2	22.4		
51.0	77	-29.2			-22.6	-17.9	-17.9	-4.1	7.0	16.2	21.2	23.1	24.2	24.3		
52.0	74	-31.3			-30.3	-25.1	-16.1	-4.2	7.1	15.2	16.4	25.1	25.0	25.0		
53.0	70	-34.1			-28.2	-24.2	-16.0	-4.3	8.0	14.5	21.4	25.2	25.6	25.7		
54.0	61	-34.4			-29.4	-27.9	-19.1	-5.5	9.7	16.0	20.4	26.4	26.0	26.9		
55.0	52	-33.2			-25.0	-25.2	-18.9	-5.0	6.2	15.4	20.8	21.5	22.0	22.1		
56.0	47	-29.6			-28.0	-26.6	-20.4	-5.0	3.8	10.7	12.0	14.1	14.5	14.5		
57.0	45	-29.0			-29.0	-23.7	-19.9	-6.8	1.0	9.4	12.0	15.4	15.7	15.7		
58.0	34	-27.3			-24.1	-17.0	-17.0	-4.0	4.5	12.1	14.2	14.7	14.1	14.1		
59.0	29	-33.6			-25.6	-17.4	-17.4	-4.5	9.7	14.5	16.2	16.4	16.6	16.6		
60.0	21	-34.0			-33.0	-17.7	-17.7	-4.2	10.7	16.0	22.7	23.1	23.3	23.3		
61.0	16	-33.0			-23.5	-23.5	-23.5	-4.0	9.5	34.1	34.4	34.6	34.7	34.7		
62.0	15	-31.9			-31.3	-31.3	-31.3	-4.5	7.6	24.2	24.4	24.6	24.7	24.8		
63.0	11	-34.7			-35.3	-35.3	-35.3	-15.5	7.3	12.4	13.1	13.4	13.4	13.4		
64.0	7	-54.1			-38.0	-38.0	-38.0	-20.2	9.3	10.4	10.4	10.6	10.6	10.6		
65.0	6	-27.9						2.0	18.1	18.0	19.1	19.2	19.3	19.3		
66.0	4	-26.7						-14.0	32.4	32.4	32.0	32.0	33.0	33.0		
67.0	4	-25.6						-14.0	-6.7	-6.4	-5.4	-6.3	-6.3	-6.3		
68.0	4	-16.2						-14.5	-5.6	-6.0	-5.0	-5.4	-5.4	-5.4		
69.0	3	-20.1						-14.5	16.3	16.4	16.4	16.6	16.6	16.7		
70.0	2	-14.9						-19.0	24.5	24.7	24.7	24.7	24.8	24.8		

Positive is wind from the right (165°).
Negative is wind from the left (345°).

DATA SOURCE										DECEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA		EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE FREQUENCY	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
SFC	744	-9.0			-8.8	-8.0	-6.6	-3.9	-1.1	+1.1	+3.1	+4.6	+5.6	+6.9	+8.0		
1.0	744	-21.0		-16.9	-13.8	-11.8	-9.9	-5.9	-0.4	+4.6	+8.0	+9.6	+10.9	+16.9	+18.0		
2.0	744	-16.0			-13.7	-11.6	-9.7	-5.7	-0.6	+3.7	+7.2	+8.7	+9.8	+12.9	+18.0		
3.0	744	-27.0		-25.9	-16.2	-13.7	-10.9	-6.3	-1.2	+2.9	+6.0	+8.4	+10.8	+14.9	+17.0		
4.0	744	-29.0		-27.9	-19.5	-15.0	-12.0	-7.3	-1.8	+3.0	+6.7	+9.4	+11.5	+17.9	+22.0		
5.0	744	-31.0		-27.9	-22.5	-17.0	-13.6	-8.4	-1.9	+3.5	+8.3	+11.2	+17.1	+20.9	+32.0		
6.0	744	-31.0			-24.7	-19.5	-15.1	-9.6	-2.7	+3.2	+8.2	+12.0	+18.5	+28.9	+40.0		
7.0	744	-36.0		-32.9	-25.2	-19.8	-16.8	-11.0	-3.1	+4.2	+8.6	+10.6	+17.8	+28.9	+55.0		
8.0	744	-37.0		-36.9	-24.8	-22.3	-18.7	-11.9	-3.7	+4.1	+10.3	+15.0	+22.7	+34.9	+55.0		
9.0	744	-36.0		-35.9	-31.5	-26.1	-21.9	-13.8	-3.8	+4.7	+11.4	+18.0	+24.7	+36.9	+49.0		
10.0	744	-47.0		-46.9	-34.5	-29.0	-23.9	-16.0	-4.7	+5.7	+13.7	+19.5	+26.7	+37.9	+58.0		
11.0	744	-45.0			-40.2	-31.6	-26.2	-17.3	-5.7	+6.0	+14.1	+24.0	+31.2	+38.9	+40.0		
12.0	744	-60.0		-44.9	-38.8	-34.2	-26.6	-18.5	-6.0	+6.0	+16.6	+24.0	+32.2	+40.9	+49.0		
13.0	744	-62.0		-43.9	-36.1	-29.6	-25.8	-17.5	-6.1	+6.7	+13.5	+22.0	+29.1	+37.9	+44.0		
14.0	744	-45.0		-41.9	-29.5	-24.0	-21.4	-15.2	-5.7	+3.2	+10.7	+14.8	+20.2	+23.9	+26.0		
15.0	744	-45.0		-35.9	-24.2	-21.8	-18.1	-13.3	-5.3	+2.8	+8.3	+12.0	+15.5	+20.9	+22.0		
16.0	744	-32.0		-30.9	-22.7	-19.1	-16.5	-11.6	-4.5	+2.7	+7.9	+11.8	+13.6	+16.9	+18.0		
17.0	744	-27.0			-20.2	-16.8	-14.3	-10.2	-3.5	+2.3	+7.4	+9.8	+13.2	+17.9	+19.0		
18.0	744	-22.0		-21.9	-16.5	-14.0	-11.6	-7.8	-2.9	+2.1	+6.4	+8.6	+10.7	+14.9	+18.0		
19.0	744	-17.0		-15.9	-12.8	-11.0	-9.1	-6.4	-2.0	+1.5	+4.5	+6.4	+7.7	+11.9	+13.0		
20.0	744	-20.0		-19.9	-11.6	-9.0	-7.6	-4.9	-1.4	+0.9	+3.6	+5.5	+6.9	+9.9	+17.0		
21.0	744	-22.0		-19.9	-10.4	-8.5	-6.2	-4.2	-1.1	+0.9	+3.0	+4.1	+5.1	+9.4	+10.0		
22.0	744	-19.0		-16.9	-8.5	-7.3	-6.3	-4.4	-1.4	+0.4	+2.2	+4.1	+5.7	+7.9	+9.0		
23.0	744	-16.0		-13.9	-9.5	-7.8	-6.7	-4.8	-1.5	+0.5	+2.4	+4.4	+5.7	+14.9	+19.0		
24.0	744	-15.0		-14.9	-10.2	-8.7	-7.6	-5.2	-2.0	+0.4	+3.4	+4.8	+5.9	+9.4	+10.0		
25.0	744	-20.0		-11.7	-10.0	-8.7	-7.5	-5.9	-2.2	+0.3	+3.7	+5.9	+8.1	+9.6	+10.0		
26.0	744	-19.0		-18.9	-11.9	-12.2	-9.7	-6.9	-2.4	+0.6	+4.6	+7.0	+9.3	+11.4	+12.0		
27.0	744	-19.0		-13.7	-12.0	-10.0	-8.9	-6.9	-2.7	+1.2	+5.5	+8.4	+9.9	+13.9	+15.0		
28.0	134	-17.4		-15.7	-12.5	-10.7	-9.0	-6.0	-1.0	+1.1	+6.0	+10.1	+13.7	+16.4	+16.4		
29.0	134	-14.6		-14.6	-12.5	-9.4	-6.5	-1.6	-1.6	+7.4	+10.9	+13.0	+15.7	+17.0	+17.2		
30.0	134	-17.8			-12.9	-9.5	-6.0	-0.7	-0.7	+1.6	+13.6	+14.4	+16.6	+25.5	+25.6		
31.0	140	-17.8			-13.0	-9.7	-7.2	-0.1	-0.1	+10.6	+19.0	+21.4	+25.4	+25.0	+26.0		
32.0	141	-22.5		-19.6	-13.6	-12.3	-7.7	-0.6	-0.6	+11.4	+25.0	+26.4	+28.4	+28.7	+29.9		
33.0	141	-19.1			-18.4	-11.5	-6.7	-0.2	-0.2	+12.4	+24.5	+27.4	+28.4	+30.0	+30.2		
34.0	141	-14.8		-14.6	-12.0	-11.6	-8.7	-0.1	-0.1	+15.2	+23.0	+26.4	+28.4	+37.7	+37.4		
35.0	141	-14.2		-17.4	-16.4	-12.6	-8.3	-0.5	-0.5	+14.4	+19.6	+26.4	+28.4	+36.1	+36.1		
36.0	141	-21.6		-22.6	-19.4	-16.0	-11.2	-0.2	-0.2	+14.9	+21.6	+23.0	+27.0	+29.4	+29.0		
37.0	141	-24.2			-23.4	-19.6	-13.7	-0.1	-0.1	+14.3	+22.3	+24.0	+30.4	+32.0	+33.2		
38.0	141	-32.6		-32.4	-28.4	-25.5	-14.0	-0.4	-0.4	+15.9	+24.0	+27.0	+34.6	+34.6	+34.7		
39.0	142	-35.8		-34.6	-32.4	-26.0	-16.2	-1.2	-1.2	+17.7	+26.0	+34.0	+41.6	+44.5	+44.6		
40.0	142	-41.0		-34.6	-30.9	-26.6	-16.7	-1.3	-1.3	+17.0	+30.0	+33.0	+44.6	+53.2	+53.5		
41.0	142	-44.9		-34.6	-29.4	-25.9	-17.5	-0.6	-0.6	+17.2	+27.0	+33.0	+34.6	+42.1	+42.3		
42.0	140	-41.5		-40.4	-28.4	-23.0	-15.0	-0.5	-0.5	+14.9	+28.0	+31.0	+34.7	+35.3	+35.4		
43.0	134	-32.6		-27.4	-26.0	-23.1	-16.4	-0.2	-0.2	+15.0	+26.5	+32.0	+34.6	+36.2	+36.4		
44.0	140	-34.4		-30.4	-26.4	-22.5	-15.4	-1.4	-1.4	+13.4	+24.0	+31.0	+37.4	+41.7	+41.9		
45.0	134	-34.0		-34.6	-27.0	-24.6	-14.4	-1.7	-1.7	+13.1	+25.4	+34.0	+35.4	+42.6	+42.6		
46.0	137	-47.1		-39.4	-27.0	-24.1	-17.1	-1.9	-1.9	+12.4	+25.7	+29.0	+32.4	+39.5	+39.5		
47.0	134	-41.5		-32.4	-29.0	-24.6	-16.5	-0.5	-0.5	+12.4	+25.6	+27.4	+31.4	+35.0	+35.2		
48.0	136	-41.3		-32.4	-30.9	-25.4	-14.2	-0.7	-0.7	+13.5	+21.2	+24.0	+30.4	+34.0	+40.1		
49.0	130	-35.5		-34.7	-32.7	-28.5	-12.4	-1.7	-1.7	+13.4	+19.5	+31.0	+31.0	+41.7	+41.4		
50.0	127	-42.8		-42.7	-31.1	-28.3	-12.0	-0.9	-0.9	+13.0	+20.4	+24.1	+29.7	+34.5	+34.5		
51.0	122	-40.1		-44.8	-29.4	-24.0	-15.5	-1.0	-1.0	+13.4	+22.4	+24.0	+29.4	+33.4	+34.0		
52.0	115	-53.8		-40.4	-30.4	-25.2	-14.7	-1.9	-1.9	+13.4	+24.4	+27.0	+27.0	+31.0	+32.0		
53.0	110	-53.2		-32.0	-29.4	-25.5	-15.4	-2.5	-2.5	+14.3	+21.5	+25.4	+25.4	+27.7	+24.4		
54.0	102	-46.2		-29.4	-29.4	-24.4	-15.7	-1.6	-1.6	+13.9	+19.0	+27.7	+30.0	+35.4	+35.7		
55.0	92	-40.2			-36.0	-30.4	-17.1	-0.7	-0.7	+10.4	+23.4	+31.0	+31.4	+32.0	+32.1		
56.0	81	-52.1			-44.2	-33.0	-19.1	-1.4	-1.4	+11.1	+22.0	+33.0	+34.4	+34.4	+34.5		
57.0	67	-54.3			-47.5	-30.6	-22.1	-1.3	-1.3	+12.4	+23.7	+25.4	+35.4	+36.0	+36.1		
58.0	51	-45.1			-31.4	-27.4	-17.5	-1.4	-1.4	+12.0	+31.5	+34.0	+34.7	+34.3	+34.3		
59.0	34	-46.0			-21.0	-23.4	-18.4	-2.0	-2.0	+32.1	+33.1	+33.6	+33.6	+33.9	+33.9		
60.0	22	-33.6				-28.9	-25.4	-13.0	-2.5	+16.0	+20.0	+20.7	+20.7	+20.4	+20.4		
61.0	15	-39.4					-27.4	-16.2	-1.4	+22.3	+22.0	+23.1	+23.1	+23.3	+23.3		
62.0	4	-36.8						-35.7	-15.0	+21.7	+25.4	+25.4	+25.4	+26.0	+26.0		
63.0	2	-39.1							-39.0	-20.5	-20.5	-20.5	-20.5	-20.4	-20.4		
64.0	1	-29.8															

RIGHT AND LEFT CROSS WIND COMPONENTS 75 DEGREE FLIGHT AZIMUTH

TABLE 9.13

DATA SOURCE										ANNUAL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 8766	-13.0	-10.8	-8.3	-6.9	-5.3	-2.8	-0.3	+1.8	+3.8	+5.0	+6.2	+8.2	+12.0			
1.0 8766	-29.0	-18.3	-12.6	-10.4	-8.0	-4.0	-0.0	+4.3	+7.8	+9.8	+12.4	+18.3	+24.0			
2.0 8766	-30.0	-20.6	-13.8	-11.0	-8.6	-4.5	-0.4	+3.4	+6.9	+8.9	+11.0	+16.3	+31.0			
3.0 8766	-34.0	-24.5	-16.0	-12.5	-9.7	-5.3	-0.7	+3.2	+6.8	+9.0	+11.3	+16.5	+32.0			
4.0 8766	-35.0	-28.5	-18.3	-13.8	-10.9	-6.3	-0.9	+3.1	+6.9	+9.4	+11.8	+18.6	+33.0			
5.0 8766	-38.0	-30.5	-20.2	-15.8	-12.3	-7.1	-1.2	+3.0	+7.1	+9.7	+12.7	+20.2	+32.0			
6.0 8766	-44.0	-31.0	-21.4	-17.3	-13.8	-8.3	-1.7	+2.9	+7.3	+10.5	+14.0	+24.4	+40.0			
7.0 8766	-43.0	-34.7	-23.5	-19.6	-15.9	-9.3	-2.0	+3.1	+7.9	+11.1	+15.2	+27.0	+55.0			
8.0 8766	-46.0	-36.7	-25.8	-21.7	-17.8	-10.6	-2.5	+3.2	+8.4	+12.3	+17.1	+29.1	+56.0			
9.0 8766	-53.0	-40.1	-28.9	-24.6	-20.1	-12.3	-2.9	+3.6	+9.7	+14.1	+19.2	+32.5	+59.0			
10.0 8766	-63.0	-45.0	-32.9	-28.3	-23.4	-14.0	-3.5	+3.9	+10.8	+15.7	+21.2	+35.4	+58.0			
11.0 8766	-63.0	-49.0	-37.8	-32.1	-26.2	-16.0	-4.3	+4.1	+11.9	+17.3	+24.0	+38.7	+59.0			
12.0 8766	-66.0	-52.0	-39.1	-33.7	-27.7	-17.5	-5.0	+4.0	+11.9	+17.5	+22.8	+37.5	+70.0			
13.0 8766	-62.0	-47.6	-36.8	-32.1	-26.8	-17.3	-5.8	+3.2	+10.4	+14.8	+20.1	+31.5	+68.0			
14.0 8766	-48.0	-42.5	-32.7	-28.2	-23.5	-16.0	-5.9	+1.7	+7.5	+11.4	+15.9	+25.5	+53.0			
15.0 8766	-57.0	-35.3	-27.3	-23.7	-19.8	-13.7	-5.0	+1.0	+5.6	+8.6	+12.1	+22.7	+42.0			
16.0 8766	-46.0	-29.5	-22.9	-19.7	-16.6	-11.0	-3.9	+1.0	+4.8	+7.4	+10.1	+17.3	+30.0			
17.0 8766	-32.0	-25.8	-19.2	-16.4	-13.5	-8.9	-2.6	+1.3	+4.5	+6.7	+8.9	+15.7	+40.0			
18.0 8766	-32.0	-21.3	-15.1	-12.9	-10.4	-6.5	-1.5	+1.6	+4.1	+5.9	+7.8	+13.5	+21.0			
19.0 8766	-21.0	-17.3	-11.5	-9.6	-7.7	-4.6	-0.7	+2.0	+4.2	+5.6	+6.9	+11.2	+20.0			
20.0 8766	-26.0	-14.2	-9.3	-7.5	-6.0	-3.5	-0.4	+2.5	+4.5	+5.7	+6.9	+10.7	+19.0			
21.0 8766	-22.0	-16.5	-8.8	-6.8	-5.3	-2.9	-0.2	+2.9	+5.4	+6.7	+7.9	+11.5	+17.0			
22.0 8766	-33.0	-14.0	-8.3	-6.7	-5.1	-2.7	-0.1	+3.5	+5.9	+7.3	+8.6	+11.6	+23.0			
23.0 8766	-15.0	-12.8	-8.0	-6.6	-5.1	-2.5	-0.0	+3.7	+6.1	+7.6	+9.0	+13.2	+27.0			
24.0 8766	-27.0	-12.6	-8.3	-6.7	-5.1	-2.6	+0.1	+3.9	+6.2	+7.6	+9.0	+13.4	+23.0			
25.0 8766	-20.0	-13.0	-9.0	-7.4	-5.7	-2.9	+0.0	+3.9	+6.3	+7.8	+9.1	+11.6	+20.0			
26.0 8766	-19.0	-14.5	-9.7	-8.1	-6.2	-3.2	+0.0	+3.9	+6.5	+7.9	+9.7	+13.5	+20.0			
27.0 8766	-19.0	-14.5	-10.3	-8.6	-6.7	-3.6	+0.0	+3.9	+6.9	+8.7	+10.3	+15.5	+27.0			
28.0 1199	-17.4	-15.4	-10.0	-7.5	-5.7	-2.3	1.0	5.0	9.7	10.4	13.4	19.4	19.4			
29.0 1224	-24.4	-15.7	-11.6	-8.4	-6.2	-3.0	1.0	6.5	9.6	11.5	14.3	20.3	27.1			
30.0 1245	-22.2	-18.3	-11.6	-8.4	-6.7	-3.1	2.0	7.3	10.6	12.0	15.2	22.3	25.6			
31.0 1262	-17.8	-12.6	-9.7	-7.5	-5.3	-3.4	2.3	7.4	11.5	14.4	19.1	25.6	27.6			
32.0 1274	-22.5	-19.6	-12.8	-10.4	-8.6	-4.5	2.0	9.1	12.4	16.0	23.7	28.3	30.3			
33.0 1299	-19.1	-15.0	-12.0	-10.0	-8.4	1.6	7.7	12.2	16.0	23.2	28.2	30.2				
34.0 1316	-20.1	-19.2	-15.2	-13.0	-11.5	-6.0	0.0	7.4	13.3	17.0	22.0	31.6	37.4			
35.0 1330	-31.9	-17.8	-17.8	-15.6	-13.5	-7.2	0.3	8.4	14.0	17.2	20.0	32.2	36.3			
36.0 1333	-32.5	-24.2	-19.2	-16.7	-14.1	-8.5	0.3	8.0	13.4	16.0	21.0	30.2	32.2			
37.0 1339	-32.8	-25.2	-19.0	-17.4	-14.3	-9.1	0.5	9.5	14.1	17.4	22.2	32.2	33.6			
38.0 1346	-31.5	-24.3	-18.0	-15.1	-12.1	-8.0	0.7	9.6	14.6	18.0	22.4	30.2	38.7			
39.0 1355	-35.8	-34.2	-24.4	-19.4	-15.7	-8.8	1.2	10.2	15.0	20.0	23.7	41.2	44.6			
40.0 1357	-41.0	-34.2	-24.2	-19.4	-15.5	-9.0	1.0	10.1	15.1	19.3	26.1	44.2	53.5			
41.0 1357	-44.9	-38.2	-25.5	-20.4	-16.3	-9.1	1.0	10.2	15.7	19.0	25.5	42.2	44.3			
42.0 1349	-41.5	-40.2	-24.5	-19.4	-15.2	-8.7	1.6	10.2	15.7	19.0	26.5	41.2	57.4			
43.0 1334	-32.6	-28.6	-23.8	-18.9	-15.1	-8.0	2.6	11.2	17.0	21.3	24.5	46.2	56.2			
44.0 1322	-36.6	-30.2	-22.0	-19.0	-16.4	-7.4	3.8	12.0	18.4	21.0	24.0	41.2	43.6			
45.0 1305	-38.0	-35.6	-23.0	-18.5	-14.1	-6.6	4.2	13.3	20.1	24.5	28.6	42.2	45.7			
46.0 1287	-42.1	-39.3	-22.8	-18.3	-14.1	-6.7	4.9	15.7	21.4	26.0	31.1	44.1	45.0			
47.0 1261	-41.6	-32.3	-23.6	-19.4	-14.7	-6.3	5.6	16.5	22.0	27.0	31.4	46.3	55.4			
48.0 1238	-41.3	-32.3	-25.2	-18.5	-13.3	-6.1	5.7	16.0	23.5	26.4	31.5	47.3	58.3			
49.0 1214	-35.5	-34.4	-27.0	-19.1	-13.9	-5.8	5.5	17.5	24.3	28.1	32.0	43.4	47.7			
50.0 1174	-42.8	-40.4	-27.6	-21.2	-14.6	-6.6	4.0	17.5	24.9	29.3	33.4	38.4	40.9			
51.0 1131	-49.1	-44.5	-24.0	-20.1	-15.2	-7.2	5.0	17.4	24.7	27.8	31.7	38.7	41.5			
52.0 1071	-51.8	-42.6	-25.8	-20.5	-16.7	-7.4	4.4	17.4	25.0	28.7	31.0	40.6	42.1			
53.0 1011	-53.2	-49.6	-27.0	-22.0	-17.5	-8.2	4.0	17.4	25.6	30.0	34.0	46.6	62.0			
54.0 924	-58.1	-45.7	-28.2	-23.0	-17.4	-10.0	4.3	17.4	26.0	30.2	33.7	51.7	72.7			
55.0 880	-52.5	-49.9	-28.8	-24.6	-18.4	-11.0	3.2	17.4	25.3	30.5	34.5	51.9	74.0			
56.0 743	-52.1	-52.0	-29.0	-25.0	-19.0	-11.0	3.6	17.0	26.7	31.4	36.4	49.0	50.2			
57.0 640	-62.1	-32.0	-29.2	-22.0	-11.9	-11.9	3.1	17.9	25.5	32.0	35.4	46.1	45.7			
58.0 515	-59.4	-31.0	-26.8	-20.6	-11.3	-2.0	2.0	16.4	27.1	34.1	35.4	42.6	43.5			
59.0 393	-51.6	-36.1	-29.1	-21.0	-12.2	-3.2	15.5	25.2	33.5	35.1	39.1	39.3				
60.0 273	-52.4	-38.1	-32.4	-27.7	-12.7	-4.0	19.2	32.1	35.3	37.4	51.4	52.3				
61.0 188	-49.8	-39.6	-35.7	-27.8	-15.2	-4.3	20.8	29.0	40.0	42.6	46.4	46.5				
62.0 124	-56.8	-37.8	-35.2	-31.4	-13.7	-2.4	21.1	30.4	36.2	40.4	46.7	46.9				
63.0 76	-74.1	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
64.0 49	-64.1	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
65.0 34	-81.5	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
66.0 29	-54.2	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
67.0 26	-40.4	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
68.0 29	-64.6	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
69.0 26	-60.0	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				
70.0 25	-64.1	-39.6	-35.2	-31.4	-13.7	-2.4	22.5	32.7	36.3	38.3	39.0	39.1				

DATA SOURCE							JANUARY									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	744	-8.0	-7.9	-6.5	-5.2	-4.1	-2.2	-0.0	+2.6	+4.9	+5.9	+7.5	+8.9	+11.0		
1.0	744	-14.0	-13.9	-10.7	-9.2	-7.8	-4.7	-2.0	+8.9	+14.3	+16.5	+18.4	+22.4	+23.0		
2.0	744	-13.0	-10.9	-6.7	-4.9	-3.6	-0.2	+5.6	+13.8	+18.4	+21.3	+24.7	+28.4	+29.0		
3.0	744	-8.0	-5.9	-3.1	-2.3	-0.5	+3.0	+9.1	+17.6	+23.5	+26.2	+28.5	+33.9	+34.0		
4.0	744	+7.0	-5.9	-2.1	-0.6	+1.2	+6.1	+12.5	+21.8	+27.5	+31.2	+33.9	+40.0	+43.0		
5.0	744	+4.0	-3.9	-1.2	+0.9	+3.7	+8.6	+16.4	+26.5	+32.9	+37.3	+41.2	+46.4	+47.0		
6.0	744	+3.0	-2.9	+0.1	+3.1	+6.1	+11.1	+20.3	+30.4	+38.2	+42.6	+45.1	+51.4	+51.4		
7.0	744	+5.0	-2.9	+1.4	+4.7	+8.2	+13.6	+24.3	+35.6	+43.9	+48.0	+51.4	+58.9	+64.0		
8.0	744	+4.0	-3.9	+2.4	+5.9	+9.1	+16.0	+28.1	+40.2	+48.7	+53.7	+57.5	+68.9	+75.0		
9.0	744	+1.0	-1.8	+5.9	+10.0	+19.0	+30.8	+43.8	+54.6	+61.2	+67.5	+72.9	+81.0	+81.0		
10.0	744	+3.0	-2.9	+2.8	+6.1	+11.6	+21.6	+34.6	+49.7	+61.4	+68.0	+71.8	+77.9	+84.0		
11.0	744	+0.0	-4.2	+7.4	+14.3	+23.4	+38.2	+53.6	+66.2	+73.2	+76.8	+80.9	+87.0	+87.0		
12.0	744	+3.0	+4.0	+7.4	+11.1	+15.8	+26.6	+41.3	+56.3	+66.5	+72.0	+76.7	+84.9	+86.0		
13.0	744	+4.0	+6.0	+9.7	+15.9	+20.0	+28.8	+40.6	+55.2	+65.4	+71.5	+77.1	+84.9	+87.0		
14.0	744	+8.0	+14.3	+17.4	+20.6	+27.6	+38.5	+51.7	+62.1	+68.7	+71.7	+80.9	+85.0			
15.0	744	+10.0	+13.8	+16.6	+19.2	+25.0	+34.5	+45.2	+54.2	+60.7	+65.0	+71.4	+75.0			
16.0	744	+8.0	+9.0	+11.7	+13.6	+15.5	+21.1	+29.3	+39.1	+46.1	+51.3	+55.1	+60.9	+68.0		
17.0	744	+4.0	+5.0	+8.4	+9.3	+11.3	+15.5	+23.4	+32.6	+37.7	+43.2	+46.7	+53.9	+55.0		
18.0	744	+2.0	+0.9	+0.1	+4.2	+6.6	+9.9	+17.0	+24.7	+31.9	+37.0	+40.7	+44.9	+46.0		
19.0	744	+5.0	+1.5	+0.3	+1.4	+5.1	+11.1	+17.9	+26.1	+33.6	+37.8	+40.8	+48.9	+50.0		
20.0	744	+10.0	-7.9	-4.6	-2.8	-1.1	+1.4	+7.0	+13.4	+19.7	+23.7	+24.1	+40.4	+41.0		
21.0	744	+15.0	-13.9	-8.9	-6.2	-3.2	-0.4	+4.3	+11.2	+18.3	+22.0	+24.1	+31.9	+36.0		
22.0	744	+27.0	-19.9	-12.2	-9.0	-5.6	-1.4	+3.4	+10.2	+16.4	+21.0	+28.2	+36.9	+46.0		
23.0	744	+19.0	-18.9	-12.2	-10.5	-8.1	-2.8	+2.9	+9.9	+16.7	+21.6	+28.5	+37.4	+38.0		
24.0	744	+27.0	-23.9	-17.2	-12.8	-10.1	-4.2	+3.4	+10.6	+17.9	+22.5	+27.7	+35.9	+39.0		
25.0	744	+27.0	-20.9	-16.2	-12.5	-9.4	-3.9	+4.2	+13.4	+20.3	+23.6	+27.7	+37.9	+41.0		
26.0	744	+27.0	-26.9	-19.7	-15.1	-10.5	-3.8	+5.4	+16.6	+24.7	+29.8	+34.5	+46.9	+50.0		
27.0	744	+32.0	-30.9	-22.5	-19.2	-13.1	-4.7	+5.8	+19.5	+27.2	+33.5	+36.6	+42.9	+52.0		
28.0	105	+21.0	-20.4	-16.4	-10.4	-4.3	0.4	17.0	25.0	26.0	26.0	29.0	36.5	39.6		
29.0	107	+26.9	-24.0	-23.4	-20.4	-7.0	10.5	23.5	24.0	32.4	34.0	37.7	37.4			
30.0	104	+34.8	-27.0	-26.4	-22.4	-0.4	11.4	24.2	32.4	35.4	37.0	37.0	40.0			
31.0	109	+33.9	-33.9	-30.4	-26.4	-10.4	14.7	30.1	35.4	40.4	41.0	45.0	46.0			
32.0	113	+40.4	-39.0	-34.7	-30.2	-10.4	14.4	39.0	39.2	43.0	44.0	47.4	44.0			
33.0	115	+47.7	-42.9	-38.4	-34.2	-10.4	19.4	35.7	39.4	42.7	45.4	46.1	46.2			
34.0	117	+54.8	-50.9	-49.4	-34.1	-10.4	21.0	36.4	41.7	46.7	50.4	52.6	52.7			
35.0	116	+64.1	-59.4	-55.4	-46.2	-0.4	21.4	36.0	43.1	48.2	48.4	49.4	50.0			
36.0	116	+64.5	-66.4	-59.7	-53.2	-4.6	21.0	37.0	43.4	44.0	49.0	50.0	51.0			
37.0	114	+75.9	-63.0	-61.7	-54.3	-4.5	22.3	37.4	43.4	44.2	44.0	54.5	54.6			
38.0	115	+81.7	-64.4	-66.4	-57.2	-7.0	25.5	34.4	35.3	37.2	40.4	40.4	50.0			
39.0	117	+74.8	-70.0	-70.2	-62.1	-0.2	26.4	34.4	45.1	46.0	46.2	49.2	49.4			
40.0	115	+85.4	-64.4	-67.4	-55.2	-7.4	27.4	34.4	45.4	47.2	47.0	50.4	50.5			
41.0	117	+86.6	-67.4	-64.4	-48.1	-4.7	27.2	40.5	47.5	44.0	44.0	51.0	51.2			
42.0	114	+83.0	-66.0	-56.4	-48.4	-4.9	25.4	39.7	44.7	52.7	53.0	54.4	55.0			
43.0	113	+95.5	-64.0	-51.4	-38.4	-7.1	24.2	39.4	51.4	54.4	59.9	53.7	63.4			
44.0	113	+94.0	-61.0	-53.4	-37.4	-7.5	23.6	40.1	55.7	61.7	63.0	68.2	64.5			
45.0	111	+90.1	-57.0	-54.5	-36.4	-5.4	22.2	44.1	59.2	54.2	64.0	64.0	68.2			
46.0	110	+90.7	-56.0	-54.5	-24.5	-4.5	23.0	44.3	60.2	52.2	63.0	64.4	68.7			
47.0	106	+84.3	-62.0	-51.4	-25.7	-4.2	23.0	45.2	50.4	62.4	65.4	66.2	65.2			
48.0	104	+80.3	-50.0	-46.4	-23.4	-1.7	24.5	44.7	54.0	60.4	67.4	64.4	64.5			
49.0	100	+59.5	-50.0	-41.7	-24.0	-0.1	26.0	47.4	54.4	64.4	64.4	64.4	64.4			
50.0	100	+53.8	-54.0	-34.7	-26.0	-1.1	30.0	44.4	59.7	52.4	63.0	58.1	68.2			
51.0	95	+55.5	-28.4	-24.2	-1.6	30.4	51.9	60.4	54.4	66.0	66.0	66.4	66.6			
52.0	84	+53.9	-27.0	-23.3	-3.0	33.2	54.0	63.4	54.0	64.0	71.2	72.2	72.4			
53.0	83	+46.8	-32.1	-13.4	-2.4	36.4	54.4	66.0	71.1	73.2	74.2	74.2	74.3			
54.0	72	+39.2	-13.4	-8.6	4.4	34.5	60.6	71.4	74.0	76.4	77.1	77.2				
55.0	64	+30.3	-12.5	-6.9	3.1	31.0	63.9	72.2	84.4	96.4	96.4	97.0				
56.0	57	+13.0	-8.7	-5.1	14.0	35.5	64.0	79.1	79.0	92.4	91.2	93.3				
57.0	46	+0.0	-8.0	-0.7	12.4	40.0	73.9	83.7	102.0	107.4	107.4	107.4				
58.0	26	4.3			4.5	11.1	44.0	73.9	87.7	137.4	137.4	137.4				
59.0	14	11.0				13.0	42.0	74.1	113.1	114.4	114.4	114.4				
60.0	10	12.4				18.4	43.0	64.4	75.4	75.7	75.4	75.0	75.9			
61.0	7	14.9				20.1	42.4	54.2	74.4	75.4	75.2	75.3	75.3			
62.0	6	24.5					52.0	70.1	71.0	71.4	71.4	71.4	71.5			
63.0	5	25.3					54.5	79.2	79.6	79.4	79.4	79.0	79.9			
64.0	4	27.0					53.5	65.4	65.9	66.0	66.1	66.1	66.1			
65.0	3	30.8					54.5	56.4	56.5	56.4	56.4	56.4	56.6			
66.0	3	22.1					53.5	57.7	58.1	58.2	58.4	58.4	58.3			
67.0	3	43.7					44.5	54.5	54.4	54.0	54.0	59.0	59.0			
68.0	4	34.5					51.0	111.4	111.4	111.0	112.0	112.0	112.0			
69.0	4	26.1					44.5	123.4	123.4	123.0	124.0	124.0	124.0			
70.0	4	21.5					39.0	127.4	127.4	127.0	124.0	124.0	124.0			

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 678	9.0				-7.7	-6.6	-4.9	-2.9	-0.2	+2.8	+5.0	+6.7	+8.5	+10.0	+11.0	
1.0 678	-18.0				-12.4	-9.5	-7.3	-3.3	+2.2	+10.1	+15.7	+17.9	+21.6	+24.5	+25.0	
2.0 678	-13.0				-9.1	-6.8	-3.5	-0.1	+6.3	+14.7	+21.5	+24.8	+28.0	+31.0	+32.0	
3.0 678	-8.0				-5.0	-3.1	-1.0	+2.4	+10.1	+19.0	+26.9	+29.8	+32.8	+38.5	+39.0	
4.0 678	-5.0				-3.4	-1.3	+0.2	+4.8	+12.4	+23.4	+30.3	+36.1	+39.2	+48.0	+49.0	
5.0 678	-6.0				-1.5	-0.4	+1.5	+7.1	+15.9	+28.0	+35.3	+40.5	+44.2	+61.0	+62.0	
6.0 678	-4.0				-1.4	+0.6	+3.8	+9.9	+20.6	+33.4	+40.5	+44.1	+49.6	+69.0	+70.0	
7.0 678	-7.0				-0.5	+2.8	+5.9	+11.9	+24.2	+37.6	+47.7	+52.3	+57.2	+81.0	+82.0	
8.0 678	-10.0				+1.3	+3.8	+6.4	+14.3	+27.5	+42.5	+53.0	+59.6	+64.2	+90.0	+91.0	
9.0 678	-16.0				+0.6	+3.6	+6.9	+15.6	+31.8	+47.7	+60.7	+65.5	+73.1	+92.0	+93.0	
10.0 678	-15.0				+2.1	+3.7	+9.1	+16.9	+36.3	+52.7	+65.5	+70.8	+75.6	+85.0	+86.0	
11.0 678	-18.0				+0.1	+5.3	+10.4	+19.7	+37.3	+57.0	+70.0	+77.2	+82.2	+88.0	+89.0	
12.0 678	-7.0				+6.2	+10.4	+13.9	+23.9	+42.3	+58.5	+73.5	+81.5	+89.2	+95.0	+96.0	
13.0 678	+0.0				+10.8	+14.0	+17.4	+25.3	+41.2	+57.9	+70.0	+77.2	+83.1	+94.0	+97.0	
14.0 678	+0.0				+11.7	+14.8	+17.8	+24.7	+38.7	+53.5	+62.0	+68.1	+76.0	+80.5	+81.0	
15.0 678	+7.0				+11.1	+13.0	+15.2	+22.2	+34.0	+46.0	+54.8	+61.1	+66.2	+73.0	+74.0	
16.0 678	+1.0				+8.8	+10.6	+12.5	+19.1	+29.0	+40.2	+48.4	+52.7	+56.1	+63.0	+64.0	
17.0 678	-4.0				+2.8	+6.2	+8.9	+14.1	+23.3	+32.7	+40.8	+44.5	+47.2	+58.0	+59.0	
18.0 678	-4.0				+0.3	+1.7	+4.4	+9.3	+16.5	+25.7	+32.4	+37.1	+40.2	+49.0	+50.0	
19.0 678	-7.0				-2.3	-0.7	+0.3	+3.5	+10.4	+18.4	+27.1	+30.5	+32.6	+48.0	+49.0	
20.0 678	-11.0				-9.3	-6.7	-4.0	-0.3	+5.3	+13.2	+19.5	+22.8	+24.2	+38.0	+39.0	
21.0 678	-14.0				-11.0	-9.1	-6.2	-2.3	+2.5	+9.0	+15.0	+16.8	+21.6	+26.5	+27.0	
22.0 678	-26.0				-14.0	-11.7	-8.6	-3.4	+1.1	+7.6	+13.0	+15.7	+19.2	+35.0	+36.0	
23.0 678	-32.0				-15.6	-12.5	-10.0	-4.0	+0.6	+4.8	+11.7	+14.5	+18.4	+22.0	+23.0	
24.0 678	-22.0				-19.4	-14.7	-10.2	-4.5	+1.1	+7.3	+11.6	+14.4	+17.1	+19.0	+20.0	
25.0 678	-28.0				-20.1	-15.6	-11.5	-5.3	+1.2	+8.2	+13.0	+15.1	+18.0	+24.0	+25.0	
26.0 678	-35.0				-19.6	-14.4	-12.6	-5.1	+2.1	+9.0	+13.9	+17.1	+19.3	+27.0	+28.0	
27.0 678	-45.0				-23.2	-17.7	-12.7	-5.5	+2.8	+10.4	+16.7	+19.7	+22.7	+28.0	+29.0	
28.0 82	-19.8				-12.1	-10.4	-8.3	-4.4	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
29.0 82	-15.0				-12.1	-10.0	-8.1	-4.4	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
30.0 81	-15.0				-9.0	-7.4	-5.8	-3.0	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
31.0 81	-11.0				-9.0	-7.4	-5.8	-3.0	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
32.0 81	-14.4				-9.0	-7.4	-5.8	-3.0	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
33.0 84	-17.8				-15.0	-11.6	-8.0	-3.0	+1.0	+7.0	+11.0	+13.1	+15.2	+25.0	+26.0	
34.0 84	-15.5				-12.0	-9.3	-3.0	-20.7	+33.0	+36.4	+37.0	+46.0	+46.0	+46.0	+46.7	
35.0 100	-10.3				-9.7	-8.0	-3.4	-10.4	+32.7	+34.4	+42.7	+44.0	+44.0	+46.0	+47.0	
36.0 102	-16.8				-14.0	-11.7	-8.0	-3.0	+20.0	+32.0	+41.0	+44.7	+48.0	+51.0	+52.0	
37.0 105	-21.0				-15.0	-11.6	-8.0	-3.0	+21.5	+33.4	+42.0	+43.0	+52.0	+57.0	+58.0	
38.0 107	-23.1				-22.0	-17.1	-13.6	-7.0	+22.7	+34.7	+41.0	+49.4	+51.0	+55.0	+56.0	
39.0 100	-27.8				-19.0	-14.1	-10.6	-6.5	+24.5	+35.0	+40.6	+49.4	+51.0	+50.0	+51.0	
40.0 100	-30.6				-21.0	-17.5	-13.6	-6.3	+25.7	+35.4	+41.5	+47.5	+51.0	+54.1	+54.2	
41.0 112	-47.6				-25.0	-21.5	-14.2	-10.2	+26.7	+37.7	+45.4	+57.5	+64.0	+64.2	+64.4	
42.0 100	-46.9				-20.0	-16.5	-12.4	-8.4	+27.0	+37.0	+44.5	+59.5	+67.0	+67.7	+67.8	
43.0 104	-40.5				-21.0	-18.4	-13.1	-13.1	+26.7	+41.2	+50.0	+62.0	+69.0	+69.1	+69.3	
44.0 106	-38.8				-16.0	-15.3	-5.7	-11.6	+28.7	+42.4	+50.7	+61.6	+62.0	+66.8	+67.0	
45.0 100	-44.5				-17.0	-10.4	-3.7	-14.8	+29.7	+45.5	+59.4	+61.6	+67.0	+69.8	+69.0	
46.0 102	-41.7				-19.0	-6.7	-1.1	-15.1	+31.5	+47.6	+58.0	+66.4	+67.0	+76.2	+76.4	
47.0 102	-31.0				-15.0	-3.7	-0.0	-14.7	+32.0	+43.4	+60.0	+65.4	+66.0	+71.4	+71.9	
48.0 98	-28.0				-1.0	-1.0	-1.0	-14.4	+34.3	+50.5	+62.1	+70.0	+76.0	+76.4	+76.5	
49.0 95	-24.0				-2.1	-7.4	-20.1	-36.5	+52.0	+66.3	+73.0	+77.1	+78.2	+78.4	+78.4	
50.0 90	-18.4				-3.0	-6.5	-21.6	-36.5	+53.7	+64.5	+68.0	+72.1	+72.7	+82.7	+82.9	
51.0 81	-15.1				-12.1	-6.2	-22.4	-36.5	+50.6	+65.0	+69.1	+71.1	+81.7	+81.4	+81.4	
52.0 50	-15.2				-13.2	-6.0	-25.7	-39.3	+54.1	+64.5	+74.9	+80.0	+80.0	+80.0	+80.0	
53.0 74	-10.6				-10.4	-12.7	-25.0	-44.0	+69.1	+71.2	+73.3	+79.0	+80.1	+80.1	+80.4	
54.0 66	-6.9				-5.5	-17.3	-29.7	-46.3	+63.4	+73.7	+77.0	+79.4	+79.4	+79.4	+79.4	
55.0 50	-1.3				-6.4	-21.0	-31.2	-40.8	+64.0	+74.5	+80.4	+84.0	+84.0	+84.0	+84.0	
56.0 50	-7.6				-14.1	-23.5	-30.0	-51.0	+64.1	+83.5	+90.0	+97.4	+97.4	+97.6	+97.6	
57.0 45	-11.7				-22.0	-22.6	-32.1	-58.3	+69.0	+88.4	+102.0	+111.6	+111.6	+112.0	+112.0	
58.0 30	-20.0						-32.1	-52.5	+64.8	+81.1	+104.1	+104.1	+104.1	+104.4	+104.7	
59.0 27	-21.8						-24.4	-50.6	+74.7	+104.7	+105.0	+105.0	+105.0	+105.0	+105.6	
60.0 20	-16.3						-16.0	-30.2	+58.0	+87.8	+103.0	+106.0	+106.0	+106.8	+106.8	
61.0 15	-0.4							-31.1	+70.5	+92.0	+101.2	+101.6	+101.6	+101.6	+101.6	
62.0 7	-1.7							-28.1	+84.5	+94.0	+96.0	+97.0	+97.1	+97.2	+97.2	
63.0 4	-37.1								+91.5	+104.3	+106.4	+106.7	+106.8	+106.8	+106.8	
64.0 2	-89.4								+88.0	+90.7	+90.0	+91.0	+91.0	+91.0	+91.0	
65.0 1	-75.3														+75.3	
66.0 2	-56.7								+57.0	+64.7	+68.0	+69.0	+69.0	+69.0	+69.0	
67.0 1	-116.0														+116.0	
68.0 3	-114.0								+110.5	+124.5	+124.0	+124.0	+125.0	+125.0	+125.0	
69.0 3	-48.0								+74.5	+115.7	+116.0	+116.0	+116.4	+116.4	+116.4	
70.0 3	-40.0								+74.5	+125.5	+126.0	+126.0	+126.0	+126.0	+126.0	

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.3

DATA SOURCE										MARCH						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-12.0	-10.9	-7.8	-6.1	-4.6	-3.0	-0.5	+2.2	+5.0	+6.6	+7.6	+8.9	+11.0		
1.0	744	-19.0	-18.9	-18.9	-8.5	-7.0	-3.7	+2.1	+8.7	+14.0	+19.1	+21.4	+22.0			
2.0	744	-12.0	-7.6	-6.3	-3.9	-0.9	+0.2	+5.7	+13.5	+17.9	+21.5	+24.7	+31.0			
3.0	744	-18.0	-15.9	-6.2	-3.3	-0.9	+2.0	+9.0	+17.4	+23.1	+27.0	+30.7	+40.9			
4.0	744	-19.0	-14.9	-1.8	-0.7	+0.1	+4.0	+12.1	+21.8	+27.8	+33.0	+39.2	+44.9			
5.0	744	-17.0	-14.9	-0.9	+0.4	+2.6	+7.3	+14.0	+24.9	+32.7	+38.0	+42.5	+49.9			
6.0	744	-19.0	-17.9	-0.8	+1.7	+5.3	+10.5	+20.4	+30.9	+38.4	+42.5	+44.8	+50.9			
7.0	744	-21.0	-15.9	-0.7	+2.9	+6.6	+13.5	+24.0	+35.7	+43.4	+47.0	+54.5	+62.4			
8.0	744	-18.0	-17.9	-0.4	+3.9	+8.4	+16.6	+27.5	+39.8	+47.7	+53.6	+60.7	+72.9			
9.0	744	-15.0	-12.9	-0.5	+5.9	+10.8	+18.5	+31.2	+44.3	+54.8	+63.0	+68.5	+82.9			
10.0	744	-15.0	-13.9	-0.7	+6.4	+12.1	+21.2	+35.5	+49.3	+62.2	+68.3	+76.5	+90.9			
11.0	744	-18.0	-16.9	+2.4	+8.6	+14.1	+24.1	+39.1	+53.7	+65.7	+74.0	+83.1	+90.9			
12.0	744	-11.0	+7.9	+5.8	+11.5	+17.4	+27.3	+41.9	+56.5	+69.4	+75.5	+81.5	+97.4			
13.0	744	-1.0	+8.4	+14.8	+20.5	+29.1	+42.3	+55.7	+63.9	+73.5	+77.5	+87.9	+93.0			
14.0	744	-2.0	+3.0	+9.4	+16.9	+20.8	+26.9	+39.0	+50.8	+59.7	+67.5	+72.5	+78.9			
15.0	744	-2.0	+4.0	+10.2	+19.3	+18.0	+24.2	+34.0	+43.7	+53.8	+59.2	+64.5	+72.4			
16.0	744	-8.0	+3.0	+6.7	+9.9	+14.0	+19.7	+29.1	+37.8	+44.5	+49.2	+53.7	+66.9			
17.0	744	-2.0	-1.9	+4.4	+6.7	+9.9	+14.4	+23.1	+31.5	+37.9	+41.2	+44.2	+54.9			
18.0	744	-2.0	+0.4	+2.8	+5.1	+8.7	+15.8	+24.3	+31.0	+34.0	+36.2	+39.9	+53.0			
19.0	744	-10.0	-9.9	-2.7	-1.4	-0.2	+3.1	+8.7	+16.9	+23.8	+27.1	+29.8	+32.9			
20.0	744	-18.0	-13.9	-8.5	-6.0	-3.3	-0.3	+4.5	+11.4	+16.7	+21.3	+26.3	+29.9			
21.0	744	-17.0	-12.7	-9.8	-7.0	-2.5	+1.8	+2.8	+12.3	+15.2	+17.8	+22.9	+24.9			
22.0	744	-35.0	-33.9	-12.7	-10.0	-7.7	-3.9	+0.2	+5.7	+10.1	+14.0	+17.7	+30.9			
23.0	744	-39.0	-34.9	-14.2	-12.5	-8.9	-4.9	-0.5	+4.1	+8.3	+11.0	+14.8	+24.9			
24.0	744	-40.0	-34.9	-14.2	-12.5	-8.9	-4.9	-0.5	+4.1	+8.3	+11.0	+14.8	+24.9			
25.0	744	-37.0	-34.9	-24.8	-17.0	-11.3	-5.4	-0.3	+4.9	+10.6	+13.8	+18.8	+23.9			
26.0	744	-35.0	-33.9	-24.7	-18.5	-10.9	-5.0	+0.1	+6.7	+12.2	+16.6	+20.3	+30.9			
27.0	744	-48.0	-40.9	-30.7	-20.2	-12.7	-5.8	+0.7	+8.0	+12.9	+18.6	+22.1	+32.9			
28.0	89	-12.4	-9.0	-6.5	-3.0	-1.5	-0.5	+0.7	+12.3	+16.6	+18.8	+23.1	+24.1			
29.0	91	-13.1	-7.0	-6.1	-1.5	-0.5	-0.5	+0.7	+12.3	+16.6	+18.8	+23.1	+24.1			
30.0	97	-10.4	-6.4	-5.6	-0.6	-0.6	-0.6	+0.7	+12.3	+16.6	+18.8	+23.1	+24.1			
31.0	94	-15.3	-5.0	-5.0	-1.1	-0.5	-0.5	+0.7	+12.3	+16.6	+18.8	+23.1	+24.1			
32.0	101	-16.0	-8.0	-7.4	-5.0	-2.0	-1.0	+0.5	+24.5	+24.5	+24.5	+24.5	+24.5			
33.0	103	-18.0	-8.7	-6.4	-3.1	-0.9	-0.9	+0.9	+27.0	+31.4	+33.8	+35.0	+37.0			
34.0	103	-18.8	-14.0	-11.7	-8.9	-2.1	-10.3	-2.2	+34.0	+34.0	+37.7	+39.0	+41.0			
35.0	109	-15.4	-15.0	-14.1	-5.6	-2.4	-19.3	-27.4	+35.4	+36.8	+39.0	+41.0	+43.0			
36.0	109	-17.4	-16.0	-15.1	-9.3	-2.6	-17.1	-25.7	+34.5	+37.1	+38.0	+39.9	+41.0			
37.0	113	-16.3	-14.0	-14.2	-6.4	-3.3	-14.1	-21.7	+31.5	+34.9	+36.0	+38.8	+40.8			
38.0	113	-17.5	-14.0	-12.4	-6.3	-3.4	-15.7	-24.5	+30.3	+30.8	+34.8	+35.0	+44.0			
39.0	114	-21.7	-15.8	-11.7	-7.6	-5.0	-16.4	-27.1	+35.1	+37.0	+41.8	+42.4	+45.0			
40.0	114	-27.7	-13.0	-13.2	-8.1	-4.7	-14.6	-27.8	+37.1	+41.0	+42.4	+42.4	+45.0			
41.0	114	-29.7	-17.8	-14.4	-8.2	-7.4	-14.7	-27.0	+37.6	+39.7	+41.8	+47.8	+48.0			
42.0	114	-29.4	-11.0	-9.4	-7.3	-7.4	-19.4	-28.8	+40.1	+41.9	+41.9	+50.8	+51.0			
43.0	114	-28.1	-12.0	-7.4	-6.1	-9.3	-21.3	-30.0	+40.2	+44.9	+44.9	+55.8	+56.0			
44.0	113	-25.5	-10.0	-7.5	-4.2	-10.8	-20.2	-32.4	+41.5	+47.6	+51.0	+53.9	+54.0			
45.0	111	-20.8	-8.0	-6.5	-2.5	-12.1	-23.0	-35.5	+41.5	+47.6	+50.9	+52.9	+53.0			
46.0	110	-15.3	-7.0	-6.1	-1.3	-12.0	-24.2	-37.4	+45.2	+49.4	+50.0	+50.9	+51.0			
47.0	104	-9.4	-6.0	-5.1	-0.7	-14.7	-24.2	-34.0	+46.3	+50.4	+51.0	+61.9	+64.0			
48.0	107	-6.5	-6.9	-5.5	-2.3	-16.7	-28.8	-39.3	+46.4	+52.4	+55.0	+64.9	+65.0			
49.0	105	-4.7	-9.0	-4.7	-0.7	-18.4	-30.0	-40.4	+49.0	+52.7	+58.0	+65.9	+66.0			
50.0	102	-10.7	0.2	7.9	10.7	23.4	39.4	45.0	+51.7	+61.0	+62.5	+62.4	+63.0			
51.0	97	-0.2	3.1	13.4	24.7	35.4	45.2	+55.4	+61.0	+64.1	+64.9	+65.0	+66.0			
52.0	94	-7.2	-1.2	9.0	25.2	36.7	48.2	+57.3	+59.9	+65.9	+65.9	+65.0	+66.0			
53.0	87	-13.8	-0.4	7.5	22.8	34.1	49.0	+56.4	+60.7	+68.3	+64.0	+64.0	+65.0			
54.0	80	-15.1	5.4	8.0	22.8	34.5	49.5	+56.5	+54.4	+64.0	+64.0	+64.0	+64.0			
55.0	69	-14.2	7.2	17.6	26.1	40.3	51.9	+62.5	+64.4	+67.2	+67.2	+67.5	+67.5			
56.0	60	-15.5	10.1	24.5	42.4	53.5	59.0	+71.1	+71.4	+71.4	+71.4	+71.4	+71.4			
57.0	51	-10.0	12.6	25.5	42.5	53.9	63.4	+81.9	+81.4	+81.4	+81.4	+81.4	+81.4			
58.0	41	-0.4	14.1	27.5	44.0	61.5	66.9	+80.7	+81.1	+81.4	+81.4	+81.4	+81.4			
59.0	32	0.4	14.2	44.0	50.4	64.2	64.2	+64.2	+64.2	+64.2	+64.2	+64.2	+64.2			
60.0	22	5.4	9.6	44.3	54.4	63.5	64.0	+64.0	+64.0	+64.0	+64.0	+64.0	+64.0			
61.0	14	6.0	8.1	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
62.0	10	6.0	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
63.0	7	6.9	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
64.0	5	15.9	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
65.0	3	0.5	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
66.0	2	5.6	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
67.0	1	7.9	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
68.0	1	0.0	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
69.0	1	-7.9	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			
70.0	1	-1.3	7.9	45.5	66.4	67.4	67.4	+67.4	+67.4	+67.4	+67.4	+67.4	+67.4			

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.4

DATA SOURCE											APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	-10.0			-7.3	-6.7		-6.0	-4.2	-1.6	+1.5	+3.7	+5.3	+6.3	+10.0	+11.0	
1.0	720	-12.0			-11.4	-10.4		-9.0	-5.6	-0.2	+6.2	+11.7	+14.9	+18.9	+21.5	+22.0	
2.0	720	-14.0			-12.1	-9.9		-6.8	-3.6	+1.8	+9.7	+14.6	+18.4	+21.9	+27.0	+28.0	
3.0	720	-16.0			-10.2	-8.3	-6.3	-2.1	+4.2	+13.0	+19.5	+23.1	+26.8	+39.0	+40.0		
4.0	720	-14.0			-10.4	-8.5	-4.9	-0.8	+6.9	+16.4	+23.0	+27.2	+30.8	+44.0	+45.0		
5.0	720	-14.0			-9.5	-6.8	-4.3	-0.0	+9.2	+20.1	+27.5	+31.8	+34.9	+51.0	+52.0		
6.0	720	-15.0			-9.9	-8.1	-4.0	+1.3	+12.3	+23.7	+32.0	+36.4	+39.4	+63.0	+64.0		
7.0	720	-19.0			-11.8	-7.6	-2.6	+3.0	+15.8	+27.4	+36.6	+42.8	+45.9	+66.0	+67.0		
8.0	720	-19.0			-11.2	-6.1	-1.1	+4.6	+18.7	+31.5	+41.6	+47.7	+52.8	+85.0	+86.0		
9.0	720	-16.0			-10.9	-5.8	-0.8	+5.6	+21.0	+35.5	+48.2	+54.2	+61.4	+94.0	+95.0		
10.0	720	-17.0			-9.7	-5.6	-0.6	+7.4	+23.7	+40.3	+53.6	+58.6	+63.9	+93.0	+94.0		
11.0	720	-17.0			-10.6	-4.2	-0.0	+9.0	+27.5	+45.6	+58.2	+64.1	+70.8	+90.0	+91.0		
12.0	720	-19.0			-9.3	-3.4	+0.7	+10.2	+31.0	+50.1	+62.2	+68.1	+71.9	+82.0	+83.0		
13.0	720	-7.0			-2.6	+0.0	+4.4	+13.6	+33.0	+50.4	+61.8	+68.1	+71.2	+84.0	+85.0		
14.0	720	-6.0			+0.1	+2.1	+5.8	+15.0	+31.2	+44.5	+58.0	+62.8	+67.4	+87.0	+88.0		
15.0	720	-6.0			+0.5	+2.1	+5.6	+14.0	+26.8	+40.3	+48.0	+53.5	+57.4	+63.0	+64.0		
16.0	720	-9.0			+0.5	+1.1	+4.3	+10.8	+21.7	+33.0	+39.5	+44.0	+48.6	+55.5	+56.0		
17.0	720	-11.0			-2.8	-0.8	+0.7	+6.8	+15.6	+25.9	+33.0	+36.8	+40.3	+50.0	+51.0		
18.0	720	-15.0			-7.4	-5.1	-1.5	+1.9	+9.3	+18.0	+24.2	+28.6	+30.9	+41.0	+42.0		
19.0	720	-11.0			-9.6	-8.3	-5.7	-1.3	+3.4	+11.2	+17.5	+21.7	+25.9	+31.0	+32.0		
20.0	720	-17.0			-10.6	-9.1	-7.1	-3.9	+0.1	+6.4	+12.0	+16.5	+20.9	+27.0	+28.0		
21.0	720	-20.0			-11.5	-9.9	-8.4	-5.6	-1.0	+3.5	+8.0	+10.5	+12.4	+21.0	+22.0		
22.0	720	-18.0			-11.7	-10.5	-9.4	-6.8	-2.4	+2.0	+5.3	+8.7	+10.4	+11.8	+12.0		
23.0	720	-19.0			-15.1	-11.4	-9.7	-7.4	-3.0	+1.0	+4.6	+6.9	+9.6	+20.0	+21.0		
24.0	720	-20.0			-14.8	-13.8	-11.1	-8.0	-2.8	+1.1	+5.2	+7.7	+10.2	+11.5	+12.0		
25.0	720	-22.0			-16.8	-13.9	-12.0	-7.9	-2.6	+2.2	+6.3	+8.9	+10.4	+13.0	+14.0		
26.0	720	-28.0			-20.3	-16.1	-13.5	-8.9	-1.7	+3.6	+8.0	+9.5	+10.6	+16.0	+17.0		
27.0	720	-26.0			-21.2	-17.3	-13.7	-8.5	-0.9	+4.8	+9.1	+11.2	+12.7	+19.0	+20.0		
28.0	94	-14.0			-17.4	-15.1	-11.1	-6.5	0.5	7.4	13.1	14.0	16.4	16.7	16.8		
29.0	94	-14.9			-15.7	-13.5	-7.8	-1.6	11.1	15.0	16.7	19.0	20.2	20.4	21.2		
30.0	103	-15.6		-15.0	-13.4	-12.6	-7.8	-2.0	11.4	18.2	19.0	20.0	21.0	21.0	21.2		
31.0	107	-19.5		-14.0	-12.4	-11.2	-6.5	4.7	14.5	19.0	19.0	21.0	21.0	25.1	25.2		
32.0	106	-14.4		-13.0	-12.7	-12.1	-6.1	5.0	14.1	19.0	20.6	22.0	22.0	29.0	30.0		
33.0	104	-14.8		-14.4	-13.5	-10.4	-4.7	15.4	20.4	24.6	24.6	25.0	25.0	27.0	27.0		
34.0	103	-13.2		-14.4	-12.4	-9.4	-4.1	5.4	17.0	22.0	27.0	27.0	29.0	30.0	31.0		
35.0	110	-13.7		-12.0	-11.7	-9.5	-5.3	6.2	17.5	25.3	27.7	30.0	30.0	34.0	34.0		
36.0	112	-15.9		-13.0	-10.5	-7.5	-4.2	5.5	16.4	24.4	20.6	25.0	30.0	34.0	39.0		
37.0	112	-14.7		-11.0	-10.5	-8.2	-4.2	6.1	15.1	20.4	24.0	25.0	25.0	30.0	31.0		
38.0	114	-14.5		-14.4	-11.4	-9.1	-5.2	6.5	13.6	22.3	24.0	26.0	26.0	34.0	35.0		
39.0	112	-14.1		-17.0	-16.5	-14.4	-8.7	5.5	13.4	19.0	21.6	24.0	24.0	31.0	32.0		
40.0	112	-20.3		-19.0	-19.2	-16.4	-8.2	5.5	14.1	22.4	25.0	28.0	28.0	35.0	35.0		
41.0	113	-14.3		-16.0	-15.4	-14.1	-7.1	5.2	15.4	22.4	26.0	26.0	33.0	34.0	34.0		
42.0	112	-10.1		-15.0	-14.4	-13.4	-7.4	3.7	15.6	22.4	29.0	30.0	35.1	35.1	35.0		
43.0	112	-20.0		-16.0	-16.2	-13.4	-8.6	3.7	15.3	27.0	31.0	33.0	33.0	40.0	40.0		
44.0	111	-21.4		-20.0	-19.5	-13.4	-10.2	3.5	16.1	23.5	32.7	37.4	38.0	38.0	38.0		
45.0	110	-21.5		-19.0	-18.7	-16.2	-9.6	4.3	16.7	21.8	35.0	38.0	43.6	43.6	43.6		
46.0	107	-26.9		-20.0	-15.6	-13.6	-9.0	5.7	14.0	23.7	38.6	40.6	40.6	50.0	50.0		
47.0	105	-19.9		-14.0	-14.4	-13.2	-8.8	6.2	19.7	27.8	41.6	49.0	52.5	52.5	52.5		
48.0	103	-14.0		-14.7	-12.4	-8.2	-4.9	5.4	19.2	33.0	45.7	49.0	52.7	52.0	52.0		
49.0	103	-20.0		-15.7	-12.0	-7.7	-4.3	14.0	30.0	46.7	49.0	49.7	50.3	50.4	50.4		
50.0	100	-20.0		-14.7	-15.0	-8.6	-6.0	6.0	20.6	33.0	48.4	48.7	49.1	49.1	49.1		
51.0	100	-20.0		-19.7	-14.0	-7.6	-6.2	21.4	39.0	45.0	47.5	49.0	49.0	49.1	49.1		
52.0	94	-20.4		-15.0	-14.6	-8.1	-6.8	14.5	41.1	46.4	48.0	49.0	49.0	49.1	49.1		
53.0	92	-17.7		-16.0	-15.2	-5.4	-4.2	19.7	39.4	44.0	47.1	47.0	47.0	47.0	47.0		
54.0	80	-17.5		-15.7	-15.0	-3.7	-3.0	22.7	40.0	46.2	47.2	47.0	47.0	47.0	47.0		
55.0	74	-25.0		-20.3	-16.1	-4.6	-1.2	19.2	27.5	42.3	47.1	48.5	48.5	48.5	48.5		
56.0	63	-27.9		-19.4	-11.8	-3.0	-13.5	27.0	44.4	48.4	49.7	50.0	50.0	50.0	50.0		
57.0	52	-17.2		-15.4	-9.4	-4.7	-15.8	24.0	45.4	49.0	49.7	50.0	50.0	50.0	50.0		
58.0	46	-16.3		-12.0	-8.8	-11.2	-14.0	25.7	45.7	49.0	77.4	77.4	77.4	77.4	77.4		
59.0	36	-19.5			-11.2	-5.0	-15.3	24.7	39.3	44.0	48.7	49.0	49.0	49.0	49.0		
60.0	25	-22.6			-9.9	-7.0	-18.2	28.0	37.0	43.4	43.4	44.0	44.0	44.0	44.0		
61.0	14	-25.8				-12.4	-14.0	24.0	29.7	30.0	30.1	30.1	30.1	30.1	30.1		
62.0	4	-21.7				-10.9	-10.0	24.7	42.0	43.0	43.3	43.5	43.5	43.5	43.5		
63.0	4	-4.3						14.0	29.4	29.0	30.0	30.0	30.0	30.0	30.0		
64.0	4	-6.0						0.0	36.4	36.4	36.0	37.0	37.0	37.0	37.0		
65.0	2	-2.7						-3.0	-1.3	-1.1	-1.0	-1.0	-1.0	-1.0	-1.0		
66.0	2	-23.4						-23.0	-3.0	-2.7	-2.4	-2.4	-2.4	-2.4	-2.4		
67.0	2	-5.8						-5.0	-1.5	-1.3	-1.2	-1.2	-1.2	-1.2	-1.2		
68.0	2	-23.4						-23.0	-17.0	-16.7	-16.4	-16.4	-16.4	-16.4	-16.4		
69.0	2	-30.6						-31.0	-24.0	-24.2	-24.1	-24.1	-24.1	-24.1	-24.1		
70.0	2	-42.1						-42.0	-27.1	-26.0	-26.0	-26.0	-26.0	-26.0	-26.0		
Positive is wind from the tail (270°). Negative is wind from the head (90°).																	

Positive is wind from the tail (270°).

Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.5

DATA SOURCE										MAY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-12.0	-10.9	-8.3	-7.2	-6.1	-4.4	-1.8	+0.3	+2.3	+3.6	+5.3	+8.9	+11.0		
1.0	744	-13.0	-12.9	-10.8	-8.8	-5.6	-1.0	+3.4	+7.5	+10.3	+12.5	+15.9	+17.0			
2.0	744	-16.0	-14.9	-11.6	-9.7	-7.7	-4.8	-0.3	+5.0	+9.1	+13.0	+15.5	+16.9	+18.0		
3.0	744	-17.0	-15.9	-11.1	-9.0	-6.6	-3.7	-0.0	+6.3	+11.1	+15.6	+18.2	+21.4	+22.0		
4.0	744	-13.0	-12.9	-10.1	-7.7	-5.9	-3.1	+0.8	+7.8	+14.3	+18.0	+22.1	+24.9	+26.0		
5.0	744	-12.0	-11.9	-8.5	-7.2	-5.2	-2.2	+1.8	+9.8	+16.9	+20.0	+21.9	+27.9	+31.0		
6.0	744	-12.0	-11.9	-8.8	-7.0	-4.7	+1.1	+3.3	+12.1	+19.2	+22.6	+24.5	+28.9	+31.0		
7.0	744	-14.0	-12.9	-9.2	-6.8	-3.8	-0.7	+5.2	+13.9	+22.2	+25.2	+27.7	+30.9	+33.0		
8.0	744	-16.0	-14.9	-8.8	-7.2	-4.7	+1.2	+6.7	+16.2	+24.3	+27.6	+31.1	+33.9	+39.0		
9.0	744	-18.0	-15.9	-10.6	-7.0	-4.7	-0.1	+8.5	+19.3	+26.6	+31.0	+33.8	+37.4	+38.0		
10.0	744	-19.0	-15.9	-11.5	-8.4	-4.7	+0.2	+10.2	+22.5	+31.8	+36.2	+39.1	+42.9	+47.0		
11.0	744	-20.0	-16.9	-11.6	-7.6	-5.0	+2.2	+12.1	+26.5	+35.2	+41.0	+43.1	+50.9	+55.0		
12.0	744	-20.0	-13.2	-7.5	-4.3	+3.2	+14.3	+29.8	+39.9	+44.5	+48.5	+53.9	+59.0	+64.0		
13.0	744	-21.0	-18.9	-11.5	-6.5	-2.4	+4.0	+16.6	+32.7	+42.1	+47.2	+51.2	+57.9	+64.0		
14.0	744	-18.0	-8.1	-4.0	-0.5	+6.0	+17.2	+29.8	+40.3	+43.3	+47.1	+50.9	+54.0			
15.0	744	-18.0	-10.9	-6.5	-3.6	-0.9	+5.0	+15.1	+24.3	+31.3	+35.1	+37.5	+39.9	+50.0		
16.0	744	-12.0	-11.9	-8.2	-5.7	-2.6	+3.1	+10.8	+19.2	+24.8	+27.0	+28.5	+30.9	+34.0		
17.0	744	-16.0	-11.9	-8.1	-6.1	-4.3	-0.2	+6.3	+12.8	+17.7	+20.6	+22.8	+24.9	+28.0		
18.0	744	-16.0	-15.9	-9.4	-8.2	-6.3	-2.4	+1.8	+7.7	+11.9	+13.7	+15.3	+20.9	+25.0		
19.0	744	-12.0	-10.5	-9.5	-7.6	-4.8	-0.7	+3.1	+7.4	+9.1	+10.8	+14.9	+14.9	+18.0		
20.0	744	-21.0	-13.9	-11.9	-10.8	-8.9	-6.6	-2.9	+0.9	+3.9	+6.1	+8.1	+11.9	+14.0		
21.0	744	-26.0	-16.9	-13.5	-12.0	-10.5	-8.1	-4.6	-0.5	+1.6	+3.2	+5.5	+9.9	+11.0		
22.0	744	-19.0	-18.9	-14.7	-13.2	-11.8	-9.6	-5.7	-1.1	+0.4	+2.2	+3.3	+6.9	+17.0		
23.0	744	-19.0	-16.8	-14.5	-12.9	-10.5	-6.2	-1.9	-0.9	+0.2	+1.0	+2.1	+6.9	+14.0		
24.0	744	-24.0	-20.9	-18.1	-16.0	-14.1	-11.4	-6.8	-2.1	-0.1	+1.0	+3.8	+5.4	+6.0		
25.0	744	-21.0	-20.9	-19.1	-16.6	-14.9	-12.0	-7.0	-1.8	-0.0	+2.2	+4.1	+7.6	+8.0		
26.0	744	-25.0	-23.9	-20.2	-17.6	-15.7	-12.5	-7.0	-1.6	+0.8	+2.8	+4.5	+8.9	+10.0		
27.0	744	-25.0	-23.9	-21.5	-19.4	-16.3	-12.5	-6.6	-0.8	+1.5	+3.5	+5.7	+9.4	+10.0		
28.0	103	-25.3	-22.0	-21.1	-20.1	-18.4	-14.6	-7.4	0.0	4.0	7.9	11.0	13.8	13.9		
29.0	105	-27.2	-21.0	-22.8	-21.4	-19.0	-13.0	-6.7	2.0	5.0	7.6	12.0	15.1	13.1		
30.0	105	-22.6	-22.6	-22.1	-19.7	-14.6	-6.1	4.1	8.0	10.0	12.0	15.0	15.9			
31.0	107	-24.2	-21.0	-20.4	-16.6	-13.8	-6.5	4.0	10.3	15.4	15.0	17.0	18.0			
32.0	110	-26.0	-23.0	-20.5	-16.0	-13.5	-4.0	4.0	10.5	13.6	14.6	14.0	15.0			
33.0	112	-26.0	-23.0	-21.5	-17.7	-12.5	-4.0	5.1	10.1	11.0	11.0	11.0	15.0	16.0		
34.0	113	-31.5	-21.0	-21.2	-19.1	-12.7	-4.1	5.4	9.4	11.7	13.0	14.8	17.0			
35.0	113	-24.7	-23.0	-22.7	-20.1	-14.0	-4.4	5.7	9.5	14.0	15.4	15.0	16.0			
36.0	113	-21.6	-20.0	-19.4	-18.4	-15.4	-5.6	4.0	10.4	11.7	14.0	17.8	19.0			
37.0	114	-21.4	-21.0	-20.7	-19.1	-16.0	-6.2	4.5	11.3	12.0	14.0	18.8	19.0			
38.0	112	-25.7	-23.0	-21.5	-20.2	-15.1	-7.8	7.4	10.4	13.6	14.0	21.8	22.0			
39.0	112	-24.2	-23.5	-21.2	-15.8	-8.0	-0.5	9.7	12.0	12.0	19.8	20.0				
40.0	115	-25.9	-25.8	-24.0	-20.7	-17.7	-10.2	-1.6	7.1	11.7	12.0	15.0	16.0			
41.0	116	-27.0	-26.0	-26.2	-23.6	-19.1	-12.1	-3.7	5.1	10.0	10.0	11.8	12.0			
42.0	116	-31.0	-29.0	-25.7	-23.7	-20.0	-12.4	-4.1	6.1	9.0	11.8	15.1	15.1			
43.0	113	-27.6	-26.0	-25.8	-24.7	-22.7	-14.1	-5.0	2.4	9.0	15.0	20.1	20.1			
44.0	112	-30.0	-30.0	-29.5	-27.4	-24.1	-16.6	-5.8	1.4	5.7	12.0	14.8	15.0			
45.0	111	-31.1	-32.0	-31.5	-29.1	-24.8	-16.6	-5.4	1.0	3.8	7.0	13.0	14.0			
46.0	108	-35.9	-33.0	-31.0	-31.1	-26.4	-16.7	-6.1	1.4	4.6	5.0	14.0	19.0			
47.0	107	-38.1	-35.0	-33.6	-30.7	-26.5	-17.1	-6.5	1.3	5.4	7.0	14.0	15.0			
48.0	106	-38.4	-35.0	-33.4	-31.7	-26.1	-17.7	-8.0	-1.1	3.0	6.0	13.0	14.0			
49.0	104	-38.7	-35.0	-34.6	-32.0	-27.5	-19.4	-10.4	-0.6	7.4	9.0	9.0	10.0			
50.0	100	-39.0	-39.0	-36.8	-34.5	-29.7	-19.0	-11.4	-5.0	1.7	5.0	8.0	8.0			
51.0	98	-38.1	-37.8	-35.1	-32.0	-27.7	-19.8	-10.4	-2.4	3.0	9.0	9.0	9.0			
52.0	95	-40.3	-38.0	-38.1	-30.1	-24.8	-14.1	-9.1	-0.7	5.8	15.1	15.1	16.0			
53.0	90	-39.1	-38.0	-38.5	-32.2	-24.0	-14.1	-9.1	-0.2	3.8	19.1	19.7	19.8			
54.0	85	-41.3	-38.7	-37.9	-30.0	-19.7	-9.8	-1.2	6.1	10.0	10.0	10.0	11.0			
55.0	74	-51.6	-47.1	-38.1	-29.8	-20.7	-9.4	-2.7	0.4	16.0	17.2	17.4				
56.0	66	-45.2	-40.7	-34.8	-28.0	-20.0	-6.7	0.7	2.7	15.0	15.0	15.0				
57.0	57	-44.0	-43.7	-41.1	-33.0	-19.8	-6.0	1.4	6.7	15.0	15.0	15.0				
58.0	43	-44.6	-41.9	-38.2	-22.8	-9.4	-3.0	3.0	31.0	31.7	32.1	32.2				
59.0	33	-46.5	-38.1	-36.4	-20.6	-7.1	10.4	11.2	11.0	11.4	11.4	11.7				
60.0	20	-50.0	-50.0	-40.8	-22.0	0.9	18.0	18.0	18.0	18.0	18.0	19.0				
61.0	12	-49.7	-47.1	-20.0	-4.1	10.5	10.0	10.0	10.0	10.0	10.0	11.1	11.1			
62.0	9	-46.1	-43.6	-22.5	-17.4	-10.2	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0			
63.0	2	-45.4	-43.0	-20.2	-18.0	-10.2	-18.0	-18.0	-18.0	-18.0	-18.0	-18.0	-18.0			
64.0	2	-39.7	-39.0	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1			
65.0	2	-37.1	-37.0	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1	-34.1			
66.0	1	-40.5														
67.0	1	-38.2														
68.0	1	-37.9														
69.0	1	-42.0														
70.0	1	-40.0														

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.6

DATA SOURCE											JUNE				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA					EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)				
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM DBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
SFC	720	-10.0			-7.5	-6.6	-5.5	-3.6	-0.9	+0.5	+2.3	+3.5	+4.6	+9.0	+10.0
1.0	720	-24.0			-9.4	-8.3	-7.2	-4.5	-0.5	+3.9	+7.6	+9.7	+11.9	+21.0	+22.0
2.0	720	-16.0			-8.3	-7.3	-6.2	-3.4	+0.2	+5.0	+8.3	+10.7	+12.8	+26.0	+27.0
3.0	720	-12.0			-8.2	-6.5	-5.3	-2.6	+0.7	+5.3	+8.7	+10.7	+14.8	+24.0	+25.0
4.0	720	-11.0			-6.9	-6.2	-5.1	-2.4	+0.9	+5.8	+10.2	+12.9	+15.4	+19.5	+20.0
5.0	720	-9.0			-8.1	-6.3	-4.9	-2.3	+1.0	+6.6	+10.5	+12.7	+15.6	+19.8	+20.0
6.0	720	-11.0			-7.9	-6.9	-5.5	-2.6	+1.4	+7.4	+11.8	+14.5	+17.9	+19.8	+20.0
7.0	720	-16.0			-9.4	-7.8	-5.8	-2.9	+1.9	+8.7	+13.4	+16.1	+18.8	+22.0	+23.0
8.0	720	-14.0			-11.1	-9.3	-6.9	-3.0	+2.2	+9.6	+15.8	+19.1	+20.4	+24.0	+25.0
9.0	720	-17.0			-12.3	-10.6	-7.8	-3.4	+2.8	+11.6	+18.3	+21.9	+24.6	+30.0	+31.0
10.0	720	-21.0			-14.9	-12.9	-9.7	-4.0	+3.9	+13.3	+21.8	+25.7	+27.9	+33.0	+34.0
11.0	720	-29.0			-21.1	-15.1	-10.2	-4.5	+4.4	+15.2	+24.5	+29.5	+32.2	+34.6	+35.0
12.0	720	-32.0			-20.5	-17.3	-11.8	-4.6	+5.1	+18.5	+30.0	+32.9	+35.7	+41.0	+42.0
13.0	720	-29.0			-22.9	-20.4	-12.7	-4.0	+6.1	+19.3	+31.5	+36.8	+39.9	+46.0	+47.0
14.0	720	-26.0			-21.2	-18.4	-13.0	-4.4	+5.4	+18.3	+28.0	+32.3	+37.4	+42.0	+43.0
15.0	720	-27.0			-18.7	-15.9	-12.0	-4.7	+3.2	+13.0	+21.4	+25.6	+27.7	+34.0	+35.0
16.0	720	-19.0			-15.3	-12.8	-10.8	-5.7	+0.5	+7.2	+13.0	+16.2	+18.2	+21.0	+22.0
17.0	720	-18.0			-14.7	-12.5	-10.0	-6.7	-1.4	+2.8	+6.5	+8.5	+9.6	+11.8	+12.0
18.0	720	-18.0			-14.9	-12.6	-11.1	-8.4	-4.3	-0.4	+2.1	+3.3	+4.4	+8.0	+9.0
19.0	720	-21.0			-15.4	-13.7	-12.6	-10.5	-6.5	-2.7	-0.8	-0.0	+0.8	+2.0	+3.0
20.0	720	-24.0			-18.9	-16.3	-14.7	-12.2	-8.3	-4.5	-2.4	-1.6	-0.8	+2.0	+3.0
21.0	720	-27.0			-19.3	-17.2	-15.8	-13.4	-10.0	-6.0	-3.7	-2.3	-0.5	+2.0	+3.0
22.0	720	-21.0			-19.4	-18.4	-17.3	-14.9	-11.2	-7.5	-4.9	-3.4	-2.3	+0.3	+0.0
23.0	720	-25.0			-20.7	-20.1	-18.7	-16.0	-12.5	-8.3	-6.2	-4.4	-2.7	+5.0	+6.0
24.0	720	-24.0			-22.2	-20.7	-19.8	-17.5	-13.1	-8.8	-6.2	-4.8	-2.7	-1.2	-1.0
25.0	720	-28.0			-24.1	-22.1	-20.7	-18.5	-13.7	-9.1	-6.4	-4.6	-2.8	-0.9	+0.0
26.0	720	-27.0			-24.9	-23.5	-21.7	-19.1	-14.0	-9.2	-6.3	-4.9	-3.0	-1.3	+1.0
27.0	720	-30.0			-26.1	-24.4	-22.6	-19.6	-14.5	-8.7	-6.0	-4.0	-2.0	+0.0	+1.0
28.0	103	-20.0			-27.0	-24.7	-22.8	-21.1	-15.4	-9.1	-6.1	-4.1	-2.0	1.0	2.0
29.0	104	-27.3			-25.4	-23.0	-20.4	-15.6	-9.4	-4.6	-1.6	0.0	1.4	1.9	2.0
30.0	107	-26.8			-26.0	-24.3	-22.4	-20.0	-14.1	-3.7	-2.9	-1.5	-1.1	-1.0	-1.0
31.0	104	-20.7			-20.6	-27.5	-25.0	-22.5	-16.0	-8.4	-5.2	-3.5	-2.5	-2.1	-2.0
32.0	109	-31.0			-29.0	-27.4	-26.6	-21.6	-16.5	-7.9	-4.2	-3.8	-2.1	-2.0	-2.0
33.0	109	-29.0				-28.2	-23.4	-15.5	-8.3	-4.5	-3.9	-2.5	-2.1	-2.0	-2.0
34.0	110	-32.4			-31.0	-30.5	-27.2	-23.5	-17.0	-8.2	-4.5	-1.5	0.0	6.0	7.0
35.0	111	-35.6			-35.0	-34.7	-28.4	-24.2	-18.1	-9.6	-4.4	-2.5	-1.1	-0.1	0.0
36.0	111	-35.8			-34.0	-32.7	-30.7	-25.1	-20.1	-11.4	-7.0	-4.0	-1.1	-1.0	-1.0
37.0	110	-35.3				-34.4	-32.4	-27.3	-21.2	-11.4	-10.3	-6.5	-4.5	-4.1	-4.0
38.0	110	-37.7				-37.7	-33.7	-29.5	-22.0	-15.2	-11.7	-11.1	-10.1	-6.4	-6.5
39.0	110	-39.9				-37.0	-36.5	-34.4	-31.1	-24.0	-17.4	-12.7	-10.5	-9.1	-9.1
40.0	110	-44.2				-40.0	-36.5	-35.4	-32.6	-25.4	-18.5	-14.5	-13.0	-10.9	-10.7
41.0	110	-51.0				-50.0	-41.5	-39.7	-34.5	-27.0	-21.2	-15.7	-14.4	-9.1	-9.0
42.0	109	-49.8				-48.7	-43.5	-40.8	-37.1	-28.7	-21.0	-19.5	-14.9	-15.5	-15.0
43.0	103	-46.2				-45.4	-43.5	-39.4	-31.4	-24.4	-21.7	-14.7	-14.0	-16.0	-15.9
44.0	109	-50.0				-44.9	-47.4	-45.3	-41.1	-33.7	-26.2	-24.1	-22.9	-21.3	-21.2
45.0	109	-53.4				-50.0	-48.0	-46.8	-41.0	-34.5	-27.5	-24.5	-23.5	-22.5	-22.2
46.0	108	-55.2				-51.0	-50.5	-47.0	-43.4	-35.0	-28.0	-25.5	-23.5	-21.5	-20.9
47.0	107	-54.6				-50.6	-54.1	-50.6	-45.5	-37.7	-29.5	-24.5	-23.0	-15.4	-15.5
48.0	101	-58.0				-57.0	-55.7	-52.5	-46.6	-38.0	-31.3	-26.0	-23.7	-21.7	-21.6
49.0	100	-65.4				-65.0	-56.0	-55.5	-44.4	-39.0	-32.0	-26.7	-22.6	-20.3	-20.2
50.0	92	-62.0				-57.0	-55.4	-49.2	-38.7	-30.3	-25.0	-20.0	-20.0	-20.4	-20.4
51.0	83	-77.5				-59.7	-56.5	-51.4	-39.4	-29.1	-24.7	-23.0	-21.3	-20.9	-20.4
52.0	80	-71.8				-64.2	-59.0	-50.0	-40.1	-30.7	-24.0	-21.0	-17.4	-17.2	-17.1
53.0	75	-82.0				-67.3	-60.2	-52.7	-40.7	-32.0	-26.0	-24.0	-14.7	-17.9	-17.4
54.0	73	-62.0					-54.2	-52.4	-43.2	-32.4	-27.8	-16.7	-14.8	-14.3	-14.3
55.0	70	-64.0					-54.0	-54.5	-43.5	-35.1	-27.7	-21.4	-2.8	-2.4	-2.5
56.0	66	-63.0					-61.7	-60.4	-53.1	-44.7	-34.2	-29.1	-25.4	-21.7	-21.1
57.0	62	-64.0					-63.4	-57.4	-50.2	-41.4	-31.4	-21.1	-13.0	5.4	5.0
58.0	52	-65.0					-63.4	-62.4	-56.7	-42.2	-32.3	-13.4	-0.0	28.4	29.0
59.0	40	-65.0					-63.0	-56.3	-44.0	-34.3	-10.0	8.1	8.4	8.9	9.0
60.0	31	-75.6					-67.4	-59.1	-43.5	-31.0	-6.5	-5.0	-5.5	-5.3	-5.3
61.0	23	-74.0					-70.0	-60.4	-46.7	-12.5	-7.1	-0.7	-4.5	-4.3	-4.3
62.0	14	-75.7						-71.0	-59.0	-17.2	0.3	0.7	0.0	1.0	1.0
63.0	6	-83.0						-60.0	-11.0	-10.4	-10.4	-10.2	-10.1	-10.1	-10.1
64.0	2	-69.6						-70.0	-51.1	-50.6	-50.7	-50.7	-50.6	-50.6	-50.6
65.0	2	-72.9						-71.0	-51.4	-53.5	-53.0	-53.4	-53.4	-53.4	-53.4
66.0	1	-57.4													-57.2
67.0	1	-57.2													-56.3
68.0	1	-56.3													

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.7

DATA SOURCE											JULY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	744	-7.0			-5.9	-5.2	-4.5	-3.1	-0.7	+0.6	+2.3	+3.2	+4.3	+7.4	+8.0	
1.0	744	-11.0			-9.2	-7.2	-6.3	-3.0	-0.0	+4.1	+7.4	+9.2	+11.5	+14.9	+18.0	
2.0	744	-15.0		-12.9	-10.1	-7.6	-5.8	-2.7	+0.2	+4.7	+7.5	+9.6	+11.7	+16.9	+20.0	
3.0	744	-18.0		-11.9	-8.9	-7.5	-5.4	-2.6	+0.2	+4.6	+8.3	+10.2	+11.8	+15.9	+20.0	
4.0	744	-12.0		-11.9	-9.2	-7.0	-5.5	-2.7	+0.1	+4.9	+9.1	+11.0	+12.2	+17.9	+21.0	
5.0	744	-11.0		-10.9	-8.7	-7.2	-5.9	-3.2	+0.0	+5.0	+9.0	+10.5	+13.1	+17.9	+19.0	
6.0	744	-14.0		-12.9	-10.4	-7.8	-6.3	-3.6	+0.2	+4.5	+7.7	+10.5	+12.6	+17.9	+21.0	
7.0	744	-15.0		-13.9	-10.6	-9.2	-7.4	-4.3	-0.4	+4.1	+7.4	+9.5	+11.8	+17.4	+18.0	
8.0	744	-20.0		-15.9	-12.3	-10.5	-8.3	-5.1	-0.6	+3.8	+8.3	+10.4	+12.7	+16.9	+18.0	
9.0	744	-20.0			-15.8	-13.0	-10.8	-6.6	-0.9	+4.1	+9.4	+11.7	+14.3	+17.9	+19.0	
10.0	744	-23.0		-22.9	-19.8	-15.6	-12.5	-8.0	-1.0	+4.6	+9.8	+14.0	+16.1	+19.4	+20.0	
11.0	744	-29.0		-26.9	-21.8	-19.0	-14.9	-9.5	-1.5	+5.3	+11.5	+14.5	+18.3	+21.9	+24.0	
12.0	744	-28.0			-25.7	-21.5	-17.7	-11.1	-2.0	+5.5	+12.4	+16.5	+18.2	+22.9	+26.0	
13.0	744	-32.0			-26.8	-24.2	-19.4	-12.6	-3.1	+5.6	+12.3	+14.8	+20.5	+24.9	+27.0	
14.0	744	-31.0			-23.5	-19.8	-17.1	-12.1	-4.1	+3.6	+9.7	+13.7	+18.1	+21.9	+23.0	
15.0	744	-28.0		-25.9	-20.1	-17.0	-14.7	-10.8	-4.7	+0.7	+4.7	+7.5	+10.8	+14.6	+15.0	
16.0	744	-19.0			-16.7	-14.5	-12.8	-9.9	-5.2	-0.7	+1.6	+2.7	+4.4	+8.9	+10.0	
17.0	744	-14.0		-14.9	-14.0	-13.1	-12.1	-9.9	-6.3	-2.6	-0.5	+0.4	+1.5	+2.9	+4.0	
18.0	744	-19.0		-17.9	-15.3	-14.2	-13.0	-11.3	-8.1	-5.2	-3.2	-2.4	-1.8	-0.0	+1.0	
19.0	744	-23.0		-19.9	-17.5	-16.3	-15.0	-13.3	-10.3	-7.5	-5.6	-4.4	-3.4	-2.3	-2.0	
20.0	744	-24.0			-21.3	-19.8	-18.8	-16.2	-12.7	-9.3	-7.0	-5.4	-4.3	-2.0	-1.0	
21.0	744	-30.0		-27.9	-24.3	-22.4	-21.0	-18.4	-14.6	-11.3	-9.1	-8.0	-6.8	-4.5	-4.0	
22.0	744	-32.0		-26.9	-25.7	-23.4	-22.0	-19.6	-15.9	-13.1	-11.3	-10.2	-9.3	-6.0	-1.0	
23.0	744	-33.0			-25.8	-24.4	-22.8	-20.8	-17.1	-13.8	-12.0	-10.9	-10.1	-7.0	-6.0	
24.0	744	-31.0		-28.9	-26.8	-25.7	-24.7	-21.9	-18.3	-14.8	-12.7	-11.6	-10.4	-5.0	-4.0	
25.0	744	-30.0			-28.7	-27.4	-25.7	-23.1	-19.3	-15.0	-12.7	-11.2	-10.2	-8.3	-8.0	
26.0	744	-34.0		-33.9	-30.3	-28.5	-26.9	-24.1	-20.0	-15.1	-12.5	-11.3	-10.1	-7.0	-10.0	
27.0	744	-35.0		-33.9	-31.7	-30.1	-28.4	-25.1	-20.1	-14.7	-12.2	-10.6	-9.3	-6.0	-3.0	
28.0	106	-31.3			-28.4	-26.2	-24.0	-21.1	-16.4	-13.6	-12.2	-10.1	-9.1	-6.3	-5.3	
29.0	108	-34.5			-32.0	-31.4	-29.6	-27.2	-21.0	-17.7	-13.7	-11.7	-11.0	-8.3	-9.2	
30.0	111	-34.0			-33.0	-32.5	-29.2	-27.2	-22.0	-17.5	-14.6	-13.6	-13.1	-12.6	-12.5	
31.0	112	-34.7			-34.0	-33.5	-31.2	-27.0	-23.4	-17.5	-15.1	-13.5	-12.1	-10.6	-10.4	
32.0	113	-35.7			-34.0	-33.7	-32.2	-28.0	-23.1	-19.3	-16.4	-13.6	-12.1	-10.2	-10.1	
33.0	117	-37.0			-34.0	-34.2	-33.1	-28.4	-23.6	-19.5	-16.0	-15.4	-15.0	-8.0	-7.4	
34.0	121	-36.0			-34.0	-34.6	-33.9	-30.0	-24.0	-19.7	-15.5	-14.0	-14.2	-13.7	-13.5	
35.0	122	-42.0			-34.0	-34.1	-37.1	-32.0	-24.1	-20.7	-19.0	-15.0	-15.1	-14.0	-13.4	
36.0	122	-41.2			-34.0	-34.2	-35.1	-31.2	-24.4	-22.4	-19.0	-16.3	-15.2	-13.0	-13.7	
37.0	122	-45.5			-40.0	-39.6	-37.8	-34.5	-29.7	-24.6	-21.0	-19.1	-17.2	-15.2	-15.0	
38.0	124	-43.5			-43.4	-43.1	-40.6	-35.7	-31.5	-26.6	-21.0	-19.4	-18.1	-15.1	-15.1	
39.0	125	-44.1				-40.9	-38.5	-33.2	-27.0	-22.1	-19.0	-17.2	-16.1	-14.1	-14.1	
40.0	125	-44.5			-45.7	-44.2	-42.7	-40.1	-34.4	-29.0	-24.7	-22.4	-20.2	-18.0	-18.5	
41.0	125	-44.6			-44.5	-44.1	-45.0	-42.8	-35.8	-30.1	-27.1	-22.4	-21.2	-15.3	-15.2	
42.0	124	-51.5			-50.0	-50.1	-47.9	-43.8	-39.5	-32.5	-28.6	-25.0	-22.1	-13.4	-13.5	
43.0	124	-57.0			-54.8	-53.2	-51.6	-47.1	-40.8	-34.6	-30.1	-22.0	-22.1	-20.4	-20.6	
44.0	122	-56.0			-55.0	-55.1	-53.8	-50.2	-44.0	-35.0	-30.5	-25.8	-24.2	-20.0	-19.8	
45.0	121	-65.0			-59.8	-58.2	-56.0	-52.0	-45.4	-37.1	-31.1	-27.0	-27.1	-25.2	-25.0	
46.0	113	-61.2			-60.8	-60.0	-59.0	-54.7	-47.1	-39.1	-33.0	-32.2	-25.2	-23.2	-23.0	
47.0	114	-64.4			-63.7	-61.1	-56.4	-49.2	-39.1	-33.3	-25.7	-25.7	-22.2	-22.2	-22.1	
48.0	117	-62.4			-61.4	-60.6	-56.4	-49.3	-41.9	-36.7	-26.7	-26.7	-22.2	-17.4	-17.3	
49.0	115	-64.5			-62.4	-60.8	-57.0	-50.0	-43.0	-38.1	-31.4	-28.1	-28.1	-23.5	-23.4	
50.0	113	-66.1			-63.4	-62.8	-57.8	-51.2	-42.0	-37.5	-31.6	-28.1	-27.4	-27.2	-27.2	
51.0	110	-66.8			-66.7	-66.2	-64.7	-59.6	-51.3	-40.4	-34.2	-30.6	-26.1	-24.1	-24.0	
52.0	108	-69.7			-69.6	-68.5	-66.6	-60.4	-51.0	-39.3	-30.7	-23.7	-23.0	-22.1	-22.0	
53.0	103	-68.7			-69.7	-68.6	-67.4	-61.3	-51.1	-39.3	-26.1	-24.4	-22.0	-18.1	-18.0	
54.0	97	-73.4			-67.0	-67.0	-60.0	-50.1	-39.2	-29.4	-26.2	-24.0	-19.0	-17.1	-17.0	
55.0	89	-74.3			-66.0	-64.5	-61.3	-50.5	-37.1	-29.7	-24.7	-24.7	-16.0	-12.1	-12.4	
56.0	84	-70.9			-70.1	-63.7	-60.2	-49.2	-35.2	-21.2	-13.0	-13.0	-4.4	-4.1	-4.0	
57.0	77	-70.0			-68.2	-67.1	-60.0	-50.1	-36.2	-21.4	-17.8	-17.8	-2.4	-2.1	-2.0	
58.0	64	-72.7			-69.5	-66.6	-61.5	-50.2	-35.5	-22.3	-17.8	-17.8	-2.7	-2.1	-2.0	
59.0	56	-71.2			-70.7	-69.2	-61.6	-44.3	-30.4	-19.4	-12.4	-7.5	-7.5	-6.9	-6.4	
60.0	41	-75.1				-72.9	-68.2	-53.2	-26.3	-12.5	-1.0	-1.5	-1.5	-1.3	-1.2	
61.0	26	-82.9					-78.0	-60.5	-35.0	-11.2	29.4	29.4	29.4	29.4	29.4	
62.0	18	-91.8					-84.5	-68.1	-40.0	-0.0	-0.0	0.0	0.0	0.2	0.2	
63.0	11	-89.5					-80.3	-55.5	-30.7	-27.6	-27.6	-27.6	-27.6	-27.1	-27.1	
64.0	9	-89.0					-83.6	-43.5	-23.4	-15.3	-15.0	-14.4	-14.7	-14.7	-14.7	
65.0	9	-70.1					-84.5	-40.7	-34.4	-22.2	-21.0	-21.4	-21.4	-21.7	-21.6	
66.0	5	-61.7						-45.5	-23.4	-23.0	-23.2	-23.2	-23.1	-23.1	-23.1	
67.0	4	-11.1						-56.0	-13.5	-12.0	-12.8	-12.7	-12.6	-12.6	-12.6	
68.0	5	-60.6						-40.5	-8.7	-8.0	-7.7	-7.7	-7.7	-7.7	-7.7	
69.0	5	-65.0						-29.5	-17.9	-17.4	-17.5	-17.5	-17.4	-17.4	-17.4	
70.0	5	-47.0						-26.5	-18.0	-19.6	-19.6	-19.6	-19.6	-19.5	-19.4	

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.8

DATA SOURCE							AUGUST							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	CUMULATIVE		PERCENTAGE FREQUENCY	99.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)	
500	744	-9.0			-5.6	-4.7		-3.9	-2.7	-0.7	+0.5	+2.0	+4.3	+7.0
100	744	-20.0		-15.9	-8.4	-7.4		-6.3	-4.0	-0.5	+3.7	+6.5	+8.7	+14.0
200	744	-22.0		-15.9	-8.1	-6.7		-5.6	-3.5	-0.3	+4.0	+6.7	+8.1	+14.0
300	744	-22.0		-14.9	-8.9	-7.0	-5.7	-3.6	-0.1	+4.3	+7.4	+9.2	+15.0	
400	744	-23.0		-14.9	-8.7	-7.6	-5.8	-3.5	-0.0	+4.4	+7.8	+9.5	+18.0	
500	744	-22.0		-15.9	-10.5	-7.3	-6.1	-3.6	-0.0	+4.8	+8.5	+10.3	+18.0	
600	744	-18.0		-12.9	-10.1	-8.6	-6.7	-4.0	-0.3	+4.5	+8.4	+10.2	+19.0	
700	744	-14.0		-12.9	-10.6	-9.5	-7.4	-4.6	-0.3	+4.3	+7.8	+9.8	+23.0	
800	744	-16.0		-14.9	-11.7	-10.4	-8.5	-5.1	-0.5	+4.0	+7.8	+10.7	+23.0	
900	744	-16.0		-15.9	-13.7	-11.8	-9.5	-5.8	-0.6	+4.4	+7.6	+10.7	+19.0	
1000	744	-20.0		-16.7	-14.5	-11.5	-8.9	-6.9	-0.4	+5.0	+8.8	+11.4	+24.0	
1100	744	-23.0		-22.9	-20.2	-17.8	-13.5	-8.0	-0.5	+5.8	+10.0	+13.0	+22.0	
1200	744	-27.0		-25.9	-22.1	-19.1	-15.9	-9.6	-0.4	+6.5	+10.9	+14.8	+20.0	
1300	744	-27.0		-26.9	-21.1	-19.5	-16.6	-10.3	-0.4	+7.1	+11.4	+14.6	+23.0	
1400	744	-26.0		-20.5	-18.3	-15.5	-9.7	-7.1	-1.1	+5.6	+9.5	+12.7	+19.0	
1500	744	-28.0		-23.9	-17.7	-14.5	-12.4	-8.2	-2.4	+2.8	+6.6	+8.6	+15.0	
1600	744	-21.0		-19.9	-13.9	-12.5	-10.5	-8.1	-3.6	-0.0	+2.9	+4.5	+9.0	
1700	744	-18.0		-15.9	-13.5	-12.5	-11.5	-9.1	-5.6	-1.7	-0.1	+0.6	+6.0	
1800	744	-17.0		-15.9	-14.7	-13.8	-12.8	-10.8	-7.8	-4.5	-2.2	-1.3	+0.0	
1900	744	-21.0		-20.9	-17.4	-16.4	-15.7	-13.4	-10.0	-7.1	-4.7	-3.6	-10.0	
2000	744	-31.0		-23.9	-21.3	-19.9	-18.7	-16.2	-12.5	-9.1	-7.0	-6.1	-4.0	
2100	744	-37.0		-24.9	-22.9	-21.6	-20.4	-18.0	-14.4	-11.1	-9.1	-8.1	-5.0	
2200	744	-39.0		-25.9	-23.8	-22.8	-21.6	-19.5	-15.8	-12.8	-11.1	-9.8	-7.0	
2300	744	-40.0		-26.9	-25.3	-24.3	-23.0	-20.5	-16.8	-13.7	-11.8	-10.6	-7.0	
2400	744	-40.0		-29.9	-26.9	-25.7	-24.4	-21.6	-18.0	-14.3	-12.2	-10.7	-9.0	
2500	744	-41.0		-31.9	-29.5	-27.6	-25.7	-22.4	-18.7	-14.9	-12.9	-11.8	-9.0	
2600	744	-35.0		-33.9	-31.6	-28.8	-26.7	-23.4	-19.2	-15.2	-12.6	-11.6	-7.0	
2700	744	-43.0		-36.9	-31.6	-29.6	-27.7	-24.4	-20.0	-15.5	-13.0	-11.6	-8.0	
2800	110	-24.1			-27.6	-25.1	-22.1	-21.2	-17.2	-13.0	-13.1	-11.1	-9.0	
2900	113	-30.4			-32.0	-29.7	-26.7	-22.9	-17.4	-15.7	-15.1	-13.4	-12.0	
3000	113	-33.4			-34.4	-32.4	-29.7	-27.7	-24.4	-20.0	-16.4	-13.4	-12.7	
3100	115	-34.9			-34.4	-32.4	-29.7	-27.7	-24.4	-20.0	-16.4	-13.4	-12.7	
3200	115	-35.0			-34.4	-32.4	-29.7	-27.7	-24.4	-20.0	-16.4	-13.4	-12.7	
3300	115	-36.8			-33.0	-30.9	-28.0	-24.1	-18.0	-15.2	-12.6	-11.6	-11.0	
3400	117	-36.0			-34.4	-32.4	-29.7	-27.7	-24.4	-20.0	-16.4	-13.4	-11.0	
3500	118	-34.5			-36.4	-33.4	-30.4	-26.4	-22.4	-18.4	-14.4	-11.4	-10.0	
3600	118	-39.1			-38.4	-35.1	-30.7	-25.4	-19.5	-13.5	-12.4	-10.2	-20.4	
3700	120	-34.7			-37.4	-36.0	-32.4	-26.4	-18.4	-14.0	-10.7	-9.7	-10.4	
3800	120	-41.2		-41.4	-39.4	-38.2	-33.0	-27.2	-19.4	-11.5	-7.7	-6.2	15.4	
3900	120	-44.2		-44.4	-44.1	-41.0	-33.4	-26.4	-20.1	-13.0	-6.0	-6.1	-2.0	
4000	110	-49.5		-45.0	-45.4	-43.1	-33.6	-26.9	-20.4	-15.5	-11.0	-11.1	-4.0	
4100	117	-47.6		-45.4	-43.7	-41.6	-37.4	-29.4	-22.2	-17.4	-12.9	-10.2	-4.6	
4200	117	-45.9		-45.4	-45.4	-43.4	-38.4	-30.4	-23.4	-17.4	-13.4	-13.1	24.0	
4300	117	-50.2		-49.4	-47.7	-46.1	-41.0	-33.4	-26.4	-20.4	-15.4	-12.9	-11.3	
4400	115	-58.0		-52.4	-51.7	-50.1	-45.0	-37.7	-29.4	-23.0	-18.0	-15.2	-3.0	
4500	114	-62.0		-58.0	-56.7	-55.1	-49.5	-39.6	-29.5	-21.2	-15.6	-13.1	-11.4	
4600	113	-62.2		-59.4	-56.4	-54.2	-48.8	-38.9	-29.0	-21.7	-15.4	-15.1	-11.0	
4700	110	-64.0		-58.0	-56.0	-56.1	-48.5	-38.0	-29.6	-21.7	-15.1	-14.1	-10.4	
4800	110	-67.0		-56.0	-56.2	-53.5	-47.4	-34.5	-24.4	-16.7	-13.6	-12.1	-4.0	
4900	104	-56.7		-56.7	-54.4	-53.4	-46.4	-34.0	-24.1	-15.7	-13.6	-12.5	-11.4	
5000	104	-61.9		-60.0	-58.4	-53.0	-45.8	-34.4	-24.0	-15.1	-12.9	-11.1	-5.0	
5100	104	-66.8		-61.0	-56.0	-54.7	-49.2	-38.6	-28.1	-18.1	-14.0	-11.0	6.0	
5200	94	-80.3			-56.4	-54.6	-48.2	-38.7	-28.1	-18.1	-14.0	-11.0	6.0	
5300	94	-50.9			-58.4	-56.4	-49.6	-39.7	-29.1	-19.5	-15.4	-12.4	12.0	
5400	91	-65.4			-59.0	-54.4	-46.9	-31.5	-21.5	-13.5	-9.0	-11.0	17.0	
5500	83	-72.3			-64.1	-51.8	-43.4	-32.2	-20.4	-14.4	-10.1	-16.2	16.0	
5600	75	-71.9			-59.4	-55.2	-40.5	-27.8	-16.0	-10.4	-7.4	-17.2	17.0	
5700	61	-64.6			-60.4	-57.0	-42.2	-29.2	-16.4	-10.4	-7.4	-21.7	22.0	
5800	44	-64.4			-60.0	-58.8	-43.4	-30.0	-17.6	-11.6	-8.4	-29.4	29.7	
5900	37	-62.6			-57.1	-56.1	-41.6	-28.1	-16.6	-10.6	-7.6	-41.6	42.0	
6000	27	-60.1			-51.6	-41.7	-31.7	-18.7	-11.7	-7.7	-4.7	-20.6	21.3	
6100	27	-64.0				-39.0	-29.0	-19.0	-12.0	-7.0	-4.0	-13.0	13.7	
6200	14	-54.4				-42.0	-31.0	-21.0	-14.0	-8.0	-5.0	-15.0	16.0	
6300	16	-65.4				-44.5	-34.5	-24.5	-17.5	-11.5	-8.5	-23.0	24.0	
6400	10	-32.0				-30.4	-20.4	-14.4	-9.4	-5.4	-3.4	-23.0	24.0	
6500	4	-4.0				-23.7	-14.5	-9.5	-6.5	-4.5	-3.5	-14.0	15.0	
6600	7	-50.0				-36.0	-26.0	-18.0	-12.0	-7.0	-5.0	-7.0	7.0	
6700	4	-53.0				-30.0	-20.0	-14.0	-9.0	-6.0	-4.0	-13.5	-13.5	
6800	5	-36.1				-16.5	-9.0	-6.0	-4.0	-3.0	-2.0	-6.0	-6.0	
6900	4	-21.1				-10.5	-6.5	-4.5	-3.5	-2.5	-1.5	-11.5	-11.5	
7000	4	-22.4				-12.0	-8.4	-6.4	-5.4	-4.4	-3.4	-8.4	-8.4	

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.9

DATA SOURCE											SEPTEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.000	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 720	-12.0				-9.2	-7.6	-6.4	-4.2	-1.6	-0.1	-1.7	-2.7	-4.5	-11.0	+12.0	
1.0 720	-25.0				-15.9	-12.8	-10.3	-6.9	-2.3	-1.7	-0.8	-9.7	-15.4	-21.5	+22.0	
2.0 720	-25.0				-16.2	-11.5	-9.2	-5.8	-1.0	-3.6	-8.7	-12.2	-15.9	-30.0	+31.0	
3.0 720	-24.0				-15.3	-9.4	-8.1	-5.0	-0.5	-4.7	-11.0	-12.8	-16.6	-34.0	+35.0	
4.0 720	-25.0				-13.7	-9.2	-7.4	-4.8	-0.4	-5.4	-10.8	-13.2	-15.7	-33.0	+34.0	
5.0 720	-28.0				-12.7	-8.6	-7.4	-4.7	-0.2	-5.8	-11.8	-14.0	-15.9	-31.0	+32.0	
6.0 720	-27.0				-12.5	-9.7	-8.1	-4.7	-0.0	-6.4	-10.8	-13.7	-15.9	-32.0	+23.0	
7.0 720	-27.0				-14.3	-11.2	-8.5	-4.8	-0.6	-7.1	-12.0	-14.7	-17.6	-22.0	+23.0	
8.0 720	-26.0				-15.9	-12.5	-8.7	-4.8	-0.8	-8.2	-13.3	-15.9	-18.4	-25.0	+26.0	
9.0 720	-22.0				-15.3	-11.4	-9.3	-4.4	-1.5	-9.6	-15.8	-18.9	-20.9	-28.5	+29.0	
10.0 720	-21.0				-14.9	-13.1	-9.8	-4.3	-2.7	-11.7	-17.6	-21.5	-25.6	-30.0	+30.0	
11.0 720	-23.0				-17.5	-13.9	-10.7	-5.2	-3.9	-13.2	-20.1	-24.2	-27.9	-35.0	+36.0	
12.0 720	-23.0				-16.8	-13.9	-10.9	-4.7	-5.3	-14.8	-22.0	-25.8	-30.4	-38.0	+39.0	
13.0 720	-24.0				-17.2	-15.1	-12.1	-4.9	-5.2	-16.3	-22.7	-26.9	-31.2	-38.0	+39.0	
14.0 720	-26.0				-16.7	-15.1	-12.0	-5.4	-4.2	-14.7	-19.6	-22.6	-26.2	-32.0	+33.0	
15.0 720	-23.0				-17.3	-14.7	-12.1	-6.4	-1.7	-9.9	-15.3	-17.1	-18.7	-20.0	+21.0	
16.0 720	-21.0				-15.6	-13.5	-10.8	-6.4	-0.3	-5.5	-10.2	-12.7	-14.2	-19.0	+20.0	
17.0 720	-17.0				-15.1	-12.7	-10.6	-7.0	-1.9	-2.5	-6.5	-8.4	-9.7	-13.0	+14.0	
18.0 720	-18.0				-13.9	-12.8	-11.4	-8.2	-3.7	-0.1	-2.8	-4.3	-6.2	-9.5	+10.0	
19.0 720	-19.0				-14.7	-13.6	-12.5	-10.1	-6.0	-2.0	-10.0	-11.4	-12.2	-15.0	+16.0	
20.0 720	-21.0				-17.5	-15.9	-15.0	-11.8	-7.8	-4.0	-1.4	-0.4	-0.0	-2.0	+3.0	
21.0 720	-22.0				-18.1	-16.8	-15.5	-13.1	-9.5	-5.8	-3.7	-2.5	-1.5	-0.0	+1.0	
22.0 720	-21.0				-19.9	-17.8	-16.5	-14.2	-10.6	-7.3	-4.8	-3.6	-2.8	-0.9	+0.0	
23.0 720	-24.0				-19.9	-19.0	-17.6	-15.1	-11.6	-7.9	-5.7	-4.3	-3.1	-0.4	+0.0	
24.0 720	-27.0				-21.7	-19.8	-18.2	-15.9	-12.1	-8.3	-6.2	-4.0	-2.4	-0.2	+0.0	
25.0 720	-24.0				-22.7	-21.5	-19.8	-17.0	-12.6	-8.9	-5.9	-4.4	-3.2	-0.0	+1.0	
26.0 720	-29.0				-23.7	-22.6	-20.9	-17.5	-12.8	-8.3	-5.5	-4.0	-3.0	-0.4	+0.0	
27.0 720	-32.0				-24.9	-23.4	-21.8	-17.9	-12.7	-7.8	-5.2	-3.6	-1.8	-0.3	+0.0	
28.0 106	-24.0				-23.0	-22.1	-20.7	-17.5	-13.4	-8.1	-4.7	-2.8	-1.1	-0.1	0.0	
29.0 107	-24.4				-25.0	-24.6	-20.9	-18.2	-13.1	-8.1	-4.6	-2.7	-2.0	-0.1	0.0	
30.0 106	-26.0				-24.0	-23.5	-20.0	-17.2	-12.1	-8.0	-3.4	-0.7	0.0	1.7	1.8	
31.0 109	-27.2				-25.0	-24.3	-21.3	-17.9	-11.7	-6.9	-1.7	-0.2	4.4	4.4	4.4	
32.0 106	-23.8				-23.7	-22.8	-20.9	-17.6	-12.1	-6.0	-1.4	0.5	1.0	4.6	4.7	
33.0 109	-22.0				-21.8	-20.6	-18.0	-11.2	-7.0	0.6	3.6	4.7	5.4	5.4	5.5	
34.0 106	-22.4				-21.0	-21.3	-16.9	-10.5	-3.3	3.3	6.6	7.0	9.0	9.0	9.0	
35.0 109	-29.5				-23.8	-21.6	-16.3	-9.5	-1.9	3.4	7.6	10.0	12.5	12.6	12.6	
36.0 106	-26.2				-23.5	-21.4	-17.1	-10.2	-1.3	3.4	6.6	7.6	9.2	9.3	9.3	
37.0 107	-30.0				-24.6	-20.3	-17.0	-9.5	-1.4	3.4	5.8	6.5	6.9	7.0	7.0	
38.0 106	-25.7				-24.0	-23.4	-22.6	-18.1	-11.0	-2.0	3.6	4.8	6.5	6.9	7.0	
39.0 106	-24.5				-26.0	-22.4	-18.7	-10.5	-2.3	4.7	5.0	7.6	7.0	7.0	7.0	
40.0 106	-29.1				-26.0	-24.7	-20.4	-18.6	-9.4	-3.0	2.7	3.0	5.0	7.0	7.2	
41.0 102	-34.4				-32.0	-29.7	-25.9	-20.2	-8.5	-0.8	1.0	4.8	7.0	10.2	10.4	
42.0 102	-42.0				-34.0	-32.7	-27.0	-20.3	-8.5	-1.3	1.7	2.0	5.0	6.5	6.5	
43.0 100	-40.4				-40.0	-35.7	-33.0	-25.1	-10.2	-1.0	2.0	4.7	7.0	9.7	9.4	
44.0 99	-42.1				-37.7	-33.1	-21.1	-10.1	-1.1	1.5	3.7	6.0	6.5	6.5	6.5	
45.0 95	-42.0				-31.8	-28.6	-19.0	-6.0	-0.4	3.3	4.0	10.1	11.0	11.1	11.1	
46.0 94	-31.0				-29.0	-26.3	-17.8	-7.8	-0.3	4.3	7.0	10.1	10.9	20.0	20.0	
47.0 86	-31.0				-29.0	-26.7	-16.7	-9.0	-0.1	8.0	12.0	12.6	12.0	13.0	13.0	
48.0 85	-29.2				-26.7	-24.7	-18.6	-7.4	2.5	6.4	11.1	12.2	12.0	13.0	13.0	
49.0 83	-28.0				-27.1	-26.3	-17.0	-7.5	4.3	7.4	8.6	13.2	13.4	13.9	13.9	
50.0 81	-26.6				-26.2	-23.5	-19.1	-5.5	7.0	10.7	16.2	17.2	17.8	17.3	17.3	
51.0 76	-31.3				-29.3	-25.1	-19.0	-4.0	7.0	13.6	16.4	22.2	22.6	22.6	22.6	
52.0 66	-33.3				-29.5	-27.3	-19.8	-4.0	5.5	10.4	16.6	26.3	26.4	26.9	26.9	
53.0 61	-33.1				-29.6	-27.5	-17.7	-0.0	7.1	14.3	14.0	25.5	26.1	26.2	26.2	
54.0 58	-30.5				-28.7	-22.7	-16.4	0.3	10.8	20.1	20.4	23.4	23.0	24.0	24.0	
55.0 55	-27.0				-23.0	-23.1	-13.3	1.8	12.5	17.6	25.7	27.5	27.0	29.0	29.0	
56.0 46	-23.5				-22.0	-20.7	-11.7	3.3	11.7	18.6	19.0	21.7	22.2	22.3	22.3	
57.0 37	-21.8				-17.1	-10.6	-1.5	13.1	13.1	23.2	25.2	25.4	26.2	26.2	26.2	
58.0 31	-18.6				-15.8	-0.1	0.5	14.1	29.5	33.4	33.4	33.4	34.2	34.3	34.3	
59.0 20	-17.5				-17.0	-0.2	0.0	19.4	24.0	28.6	28.6	28.6	29.0	29.0	29.0	
60.0 12	-15.0						-12.1	5.0	32.1	35.4	35.7	35.0	35.0	36.0	36.0	
61.0 8	-17.0						-11.7	3.0	37.7	39.4	40.1	40.2	40.3	40.3	40.3	
62.0 6	-24.0							-15.0	58.0	58.7	58.0	58.0	58.0	59.0	59.0	
63.0 6	-22.3							-10.0	80.0	80.7	80.0	80.0	81.0	81.0	81.0	
64.0 2	-15.0							-15.0	2.7	2.0	3.0	3.0	3.0	3.0	3.1	
65.0 1	32.3														32.3	
66.0 1	41.2														41.2	
67.0 1	26.9														26.9	
68.0 1	14.0														14.0	
69.0 1	0.7														0.7	
70.0 1	1.8														1.8	
Positive is wind from the tail (270°). Negative is wind from the head (90°).																

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.10

DATA SOURCE										OCTOBER				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)							
				LATITUDE	LONGITUDE									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956								
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967								
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967								
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA														
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE PERCENTAGE FREQUENCY	95.000	97.720	99.000	99.865	MAX DIR	DIR (DEG)
50.0	744	-13.0	-12.9	-9.1	-8.1	-6.4	-3.9	-0.8	+1.0	+2.6	+3.9	+4.9	+6.9	+12.0
1.0	744	-17.0	-14.4	-12.8	-11.2	-7.1	-1.7	+3.3	+7.1	+9.1	+11.8	+18.9	+21.0	
2.0	744	-17.0	-16.9	-13.2	-10.6	-8.6	-5.0	-0.1	+5.9	+9.8	+12.6	+15.5	+21.4	+22.0
3.0	744	-17.0	-14.9	-12.3	-9.4	-6.5	-2.9	+1.3	+7.3	+12.4	+15.0	+19.5	+24.9	+27.0
4.0	744	-15.0	-13.9	-10.1	-7.0	-5.1	-1.7	+2.9	+9.1	+14.2	+18.5	+21.2	+27.9	+33.0
5.0	744	-15.0	-13.9	-7.1	-5.9	-4.2	-0.9	+1.6	+11.3	+17.3	+20.0	+25.7	+31.9	+34.0
6.0	744	-10.0	-9.9	-7.6	-5.2	-2.8	-0.3	+1.9	+13.5	+20.1	+24.2	+27.2	+36.9	+46.0
7.0	744	-10.0	-9.9	-6.8	-5.7	-2.9	+0.2	+8.3	+16.3	+23.9	+28.3	+31.5	+44.9	+58.0
8.0	744	-8.0	-7.9	-6.8	-4.6	-1.9	+1.1	+10.7	+19.7	+29.3	+33.2	+34.1	+50.9	+62.0
9.0	744	-9.0	-7.9	-5.6	-4.4	-1.8	+2.5	+12.6	+23.9	+33.4	+40.2	+43.5	+55.9	+77.0
10.0	744	-13.0	-12.9	-8.1	-4.6	-1.8	+3.4	+15.1	+27.8	+37.4	+44.0	+48.5	+61.9	+75.0
11.0	744	-18.0	-15.9	-7.5	-5.2	-1.4	+4.1	+17.7	+31.8	+40.8	+45.0	+49.5	+68.9	+74.0
12.0	744	-19.0	-10.9	-7.2	-4.0	-0.9	+5.5	+19.6	+33.7	+42.2	+46.5	+49.8	+64.9	+73.0
13.0	744	-11.0	-10.9	-6.2	-4.1	-0.7	+6.0	+19.2	+33.1	+41.8	+46.3	+49.6	+56.9	+62.0
14.0	744	-9.0	-5.7	-3.6	-0.5	+0.5	+5.0	+18.0	+29.9	+37.4	+43.4	+47.8	+54.9	+64.0
15.0	744	-8.0	-7.9	-5.4	-3.6	-0.6	+3.8	+14.6	+24.2	+31.1	+36.2	+40.1	+49.9	+59.0
16.0	744	-7.0	-5.5	-3.5	-1.3	-2.1	+10.0	+18.5	+24.1	+28.2	+30.5	+40.9	+42.0	
17.0	744	-8.0	-6.6	-5.5	-3.1	-0.3	+5.0	+12.3	+18.5	+22.7	+25.5	+31.4	+32.0	
18.0	744	-9.0	-8.9	-7.3	-6.2	-4.9	-2.3	+1.2	+6.9	+11.8	+15.7	+21.1	+25.9	+37.0
19.0	744	-13.0	-11.9	-9.2	-7.8	-6.8	-4.3	-0.7	+3.4	+7.8	+11.0	+13.1	+22.9	+28.0
20.0	744	-12.0	-10.3	-8.8	-7.8	-6.1	-2.1	+1.1	+4.9	+7.6	+10.6	+18.9	+20.0	
21.0	744	-12.0	-10.6	-9.7	-8.8	-6.8	-2.9	+0.2	+4.1	+6.0	+7.1	+14.9	+17.0	
22.0	744	-14.0	-11.9	-10.7	-9.7	-7.4	-3.4	-0.2	+2.9	+5.0	+6.8	+9.9	+11.0	
23.0	744	-16.0	-14.9	-13.5	-12.1	-10.9	-7.9	-4.0	-0.0	+2.9	+4.8	+7.2	+9.9	+13.0
24.0	744	-16.0	-15.9	-13.6	-11.9	-11.1	-8.5	-3.9	+0.1	+3.5	+6.1	+7.7	+9.9	+12.0
25.0	744	-15.0	-14.9	-12.3	-11.3	-8.3	-3.5	-0.7	+0.7	+4.6	+7.2	+9.1	+11.9	+14.0
26.0	744	-16.0	-15.9	-14.5	-13.0	-11.7	-8.1	-2.6	+2.1	+6.0	+8.8	+10.9	+13.9	+15.0
27.0	744	-18.0	-16.9	-15.7	-13.7	-11.6	-7.3	-1.9	+3.6	+8.1	+10.7	+12.1	+15.4	+16.0
28.0	74	-18.0	-15.2	-12.1	-7.7	-1.0	-1.0	-1.0	5.6	8.7	9.6	10.7	10.0	11.0
29.0	82	-16.0	-13.6	-10.4	-7.4	-2.0	-4.7	10.5	11.6	13.2	14.6	18.0	19.1	
30.0	84	-14.0	-10.1	-9.0	-6.7	2.1	4.4	12.4	14.4	16.4	18.4	19.4	19.0	
31.0	85	-17.0	-14.1	-11.7	-5.5	2.1	10.6	17.4	19.1	20.2	20.9	21.0	21.0	
32.0	90	-17.0	-12.0	-9.5	-4.7	4.6	13.2	19.5	22.0	25.1	25.9	26.0	26.0	
33.0	90	-11.8	-9.5	-7.7	-3.0	6.3	14.0	22.5	24.0	30.1	30.9	31.0	31.0	
34.0	90	-9.0	-7.0	-6.2	-2.0	4.3	20.7	26.5	27.7	29.1	29.5	29.6	29.6	
35.0	90	-11.0	-9.0	-6.9	-2.4	12.0	23.4	29.5	34.0	35.7	36.3	36.3	36.3	
36.0	91	-13.0	-8.0	-6.2	-2.0	11.5	24.9	29.9	34.0	34.1	34.4	34.4	34.4	
37.0	90	-14.0	-10.0	-9.5	-2.6	10.8	25.5	33.2	34.0	40.1	40.0	41.0	41.0	
38.0	89	-17.0	-10.9	-7.8	-1.0	12.6	28.0	35.3	38.0	43.1	43.8	44.0	44.0	
39.0	94	-12.0	-9.6	-8.4	-0.7	13.7	34.0	39.3	43.0	45.1	45.7	45.8	45.8	
40.0	95	-12.0	-8.0	-6.2	0.1	16.4	35.4	43.3	46.0	49.1	50.2	50.4	50.4	
41.0	94	-13.0	-8.0	-6.3	0.6	18.0	35.5	49.2	50.0	52.4	53.0	53.1	53.1	
42.0	97	-13.0	-8.4	-6.6	3.2	19.4	37.4	53.1	55.4	59.0	59.7	59.8	59.8	
43.0	97	-12.6	-8.4	-7.1	3.4	21.4	43.3	54.2	57.4	60.0	61.2	61.4	61.4	
44.0	94	-14.0	-10.4	-6.3	5.9	24.0	44.1	53.4	59.0	60.7	61.2	61.3	61.3	
45.0	92	-10.0	-8.0	-4.7	6.2	25.0	46.7	55.4	58.0	64.1	64.6	64.7	64.7	
46.0	91	-14.0	-8.0	-5.4	8.4	27.3	46.5	57.2	60.0	66.1	66.7	66.8	66.8	
47.0	91	-14.0	-8.4	-3.5	8.4	29.4	48.3	58.4	60.0	65.0	65.4	65.4	65.4	
48.0	89	-7.0	-2.0	3.2	9.1	32.3	50.9	61.4	64.0	73.2	74.3	74.4	74.4	
49.0	86	-9.0	5.1	11.4	34.0	53.4	65.7	71.4	74.1	82.1	82.7	82.8	82.8	
50.0	84	1.0	5.1	16.4	35.0	59.7	71.4	74.1	74.1	84.1	84.4	84.4	84.4	
51.0	79	1.0	3.4	4.5	15.2	37.5	59.2	75.1	80.2	81.2	81.9	82.0	82.0	
52.0	75	2.0	2.7	4.4	16.0	34.4	54.0	77.3	80.3	91.2	91.7	91.8	91.8	
53.0	70	3.0	4.2	4.4	14.1	42.0	57.9	73.5	74.6	84.3	84.9	85.0	85.0	
54.0	63	4.2	5.2	7.2	14.0	43.3	61.0	71.0	76.4	74.4	79.0	79.1	79.1	
55.0	57	4.1	5.2	7.9	22.0	43.4	60.7	72.2	74.7	74.8	79.4	79.4	79.4	
56.0	48	4.5	5.4	9.4	18.3	43.0	59.4	75.4	77.0	78.0	78.7	78.7	78.7	
57.0	40	4.0	7.0	15.3	43.0	61.0	74.0	74.0	84.1	84.4	84.9	85.0	85.0	
58.0	34	4.0	4.7	10.7	40.0	61.6	73.2	73.2	73.2	74.0	74.2	74.2	74.2	
59.0	27	3.0	3.4	13.3	39.5	61.7	73.7	77.3	77.3	77.4	77.7	77.8	77.8	
60.0	22	-1.0	-0.9	9.5	34.0	66.5	73.0	81.4	81.4	81.7	81.9	82.0	82.0	
61.0	14	-4.4	25.2	47.5	71.4	85.3	85.3	85.3	85.3	85.0	85.1	85.2	85.2	
62.0	4	24.4	44.0	77.4	72.0	73.0	73.0	73.0	73.0	73.1	73.1	73.1	73.1	
63.0	2	34.0	34.0	87.0	87.0	87.3	87.3	87.3	87.3	87.4	87.4	87.4	87.4	
64.0	1	39.0											39.0	
65.0	1	47.0											47.0	
66.0	1	24.1											24.1	
67.0	1	14.6											14.6	
68.0	1	5.0											5.0	
69.0	1	7.9											7.9	
70.0	1	21.8											21.8	
Positive is wind from the tail (270°). Negative is wind from the head (90°).														

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-9.0			-7.1	-6.2	-5.1	-3.0	-0.5	+1.8	+3.5	+5.0	+5.9	+10.0	+11.0	
1.0	720	-17.0			-12.7	-11.2	-9.6	-6.9	-1.0	+5.4	+10.6	+12.9	+16.9	+22.0	+23.0	
2.0	720	-17.0			-12.1	-9.7	-8.0	-4.6	+0.8	+8.1	+14.4	+18.1	+21.8	+27.6	+28.0	
3.0	720	-16.0			-9.9	-7.3	-5.5	-1.8	+3.0	+11.3	+18.1	+20.9	+23.7	+35.5	+36.0	
4.0	720	-11.0			-8.8	-7.1	-3.8	-0.4	+5.1	+13.5	+20.4	+24.1	+27.4	+36.0	+37.0	
5.0	720	-13.0			-7.9	-6.1	-3.1	+0.7	+2.0	+17.3	+23.7	+27.3	+31.6	+41.0	+42.0	
6.0	720	-12.0			-7.7	-5.1	-2.0	+2.7	+10.7	+20.7	+28.4	+32.4	+36.8	+51.0	+52.0	
7.0	720	-12.0			-6.3	-4.1	-0.7	+4.4	+19.1	+23.8	+31.8	+35.9	+39.7	+50.0	+51.0	
8.0	720	-16.0			-6.9	-3.6	-0.5	+6.9	+17.2	+27.4	+35.6	+41.4	+44.9	+56.5	+57.0	
9.0	720	-17.0			-7.7	-2.8	+0.2	+9.2	+20.3	+30.8	+39.2	+45.3	+51.9	+71.0	+72.0	
10.0	720	-21.0			-8.3	-4.2	+0.4	+10.4	+23.3	+35.3	+43.4	+51.7	+58.8	+85.0	+86.0	
11.0	720	-19.0			-7.8	-1.6	+3.0	+13.1	+24.0	+38.4	+46.2	+54.5	+62.4	+83.0	+84.0	
12.0	720	-12.0			-7.3	-2.1	+3.3	+14.4	+28.6	+41.1	+48.4	+55.8	+64.8	+91.0	+92.0	
13.0	720	-16.0			-6.5	-0.2	+5.3	+15.9	+29.0	+40.5	+47.8	+54.2	+62.2	+87.0	+88.0	
14.0	720	-13.0			-4.7	+1.4	+7.0	+14.5	+26.5	+37.3	+43.4	+49.8	+55.2	+70.0	+71.0	
15.0	720	-12.0			-2.8	+0.3	+4.6	+13.0	+23.0	+31.3	+37.3	+41.1	+43.7	+56.0	+57.0	
16.0	720	-10.0			-2.7	-0.3	+3.2	+9.4	+18.9	+25.6	+30.6	+33.5	+35.7	+49.0	+50.0	
17.0	720	-6.0			-3.4	-1.4	+1.0	+5.9	+13.4	+20.1	+24.6	+28.5	+30.5	+38.0	+39.0	
18.0	720	-9.0			-6.3	-4.3	+1.7	+2.1	+8.7	+14.4	+19.5	+21.5	+24.2	+29.0	+30.0	
19.0	720	-11.0			-7.7	-5.4	-2.7	-0.2	+6.9	+9.9	+14.3	+17.3	+19.6	+29.0	+30.0	
20.0	720	-9.0			-7.6	-4.1	+4.4	+2.7	+7.6	+12.8	+15.1	+18.9	+25.0	+26.0		
21.0	720	-14.0			-7.9	-6.8	-4.9	-1.9	+1.7	+6.9	+11.7	+14.5	+18.4	+25.5	+26.0	
22.0	720	-13.0			-7.9	-6.9	-5.7	-2.3	+1.8	+7.2	+12.3	+16.1	+18.2	+27.0	+28.0	
23.0	720	-15.0			-9.5	-8.0	-6.5	-1.8	+2.7	+8.0	+13.2	+16.5	+19.4	+28.0	+29.0	
24.0	720	-21.0			-10.5	-9.1	-6.6	-1.7	+4.1	+9.7	+14.4	+17.5	+19.2	+24.0	+25.0	
25.0	720	-17.0			-10.7	-8.5	-6.6	-1.3	+5.8	+12.2	+16.6	+19.6	+21.8	+34.0	+35.0	
26.0	720	-19.0			-11.9	-10.1	-6.1	-0.7	+7.4	+14.2	+18.4	+20.9	+23.9	+33.0	+34.0	
27.0	720	-22.0			-14.3	-10.8	-6.2	+0.0	+9.6	+16.9	+20.8	+22.6	+24.9	+32.5	+33.0	
28.0	84	-16.9				-6.0	-3.8	1.8	11.4	20.2	24.5	26.0	29.1	29.0	30.0	
29.0	90	-14.9				-9.0	-4.5	2.8	14.2	23.4	28.4	30.0	32.1	32.4	32.7	
30.0	90	-12.9				-8.0	-6.5	4.3	17.2	25.4	33.5	34.0	34.8	35.1	35.1	
31.0	91	-15.0				-8.0	-2.5	7.5	19.2	27.0	34.5	36.0	40.1	40.5	40.6	
32.0	91	-0.8				-1.0	0.3	11.1	21.8	32.5	37.5	39.0	43.1	44.2	44.4	
33.0	92	-17.0				0.0	1.3	13.6	24.7	35.7	41.5	42.0	45.1	45.0	46.0	
34.0	92	-22.0				-0.9	4.3	16.5	27.3	34.0	43.4	45.0	46.1	46.0	47.0	
35.0	92	-23.0				2.0	6.5	16.3	29.7	41.4	47.5	48.0	49.5	49.0	50.0	
36.0	90	-25.0				4.0	8.5	18.1	31.0	43.7	49.5	51.0	54.1	55.3	55.5	
37.0	91	-24.0				7.1	9.6	18.2	33.5	45.2	49.9	55.0	54.0	58.4	58.5	
38.0	94	-21.0				6.2	11.4	21.5	36.7	44.3	53.3	56.0	60.1	61.0	61.2	
39.0	94	-6.0				6.1	11.7	22.0	39.3	51.0	53.6	54.0	63.0	63.5	63.6	
40.0	93	0.0				12.1	14.7	27.3	42.5	51.4	59.2	59.0	65.1	65.4	66.0	
41.0	93	1.8				14.1	17.4	27.4	46.5	54.7	59.4	60.0	65.1	64.3	65.4	
42.0	93	1.8				16.1	18.7	30.4	46.8	56.6	63.1	63.7	66.1	66.4	66.9	
43.0	92	2.8				17.0	20.6	33.2	49.0	62.1	65.4	67.4	69.1	69.9	70.0	
44.0	94	15.1				19.0	24.4	35.0	51.5	65.3	71.3	74.0	75.5	75.9	76.0	
45.0	97	14.0				16.0	27.4	34.4	54.5	71.2	76.7	82.0	85.1	85.9	86.0	
46.0	96	9.0				17.0	28.3	41.1	59.0	78.7	80.4	89.0	89.4	89.9	90.0	
47.0	93	6.0				17.0	30.2	44.4	65.8	77.5	84.4	92.1	92.4	92.9	93.0	
48.0	92	7.0				15.0	36.1	44.0	69.0	81.7	90.0	92.4	93.2	93.9	94.0	
49.0	95	11.0				15.0	35.3	45.7	70.1	87.1	93.4	95.1	97.2	97.0	98.0	
50.0	94	12.0				20.0	30.2	51.7	73.3	84.7	96.0	102.1	111.2	111.0	112.0	
51.0	77	12.0				14.8	26.9	51.2	74.5	84.3	100.2	103.2	111.3	112.3	112.5	
52.0	74	11.0				19.7	26.7	49.0	74.0	84.3	100.3	104.3	112.3	112.0	113.0	
53.0	70	9.0				19.5	27.5	54.1	72.7	90.9	102.5	109.0	112.4	112.0	113.0	
54.0	61	5.0				25.4	34.1	54.7	75.2	90.4	105.0	107.4	112.4	112.9	113.0	
55.0	52	5.0				27.2	37.3	57.3	76.5	90.7	104.4	104.4	107.5	107.0	109.0	
56.0	47	6.0				28.0	28.7	54.2	76.5	96.5	105.7	104.0	110.5	110.9	111.0	
57.0	45	10.0				18.0	28.3	59.1	76.2	95.4	104.4	112.0	116.4	117.3	117.4	
58.0	34	19.3					25.9	57.0	75.0	94.3	110.1	123.0	123.0	124.4	124.4	
59.0	29	20.6					33.5	58.6	81.5	92.4	101.6	103.0	103.0	103.5	103.6	
60.0	21	34.9					42.1	64.3	77.5	100.7	107.0	112.0	112.0	113.1	113.1	
61.0	16	36.5						63.3	79.0	86.7	115.3	115.0	116.1	116.2	116.3	
62.0	15	40.7						66.4	75.5	87.5	122.2	122.0	122.7	122.8	122.4	
63.0	11	34.7						58.7	72.5	89.5	94.0	94.0	94.0	94.0	94.0	
64.0	7	54.0						56.1	73.3	82.0	124.5	124.0	124.0	124.7	124.7	
65.0	6	46.0							65.0	76.0	76.7	76.0	76.0	77.0	77.0	
66.0	4	30.0							55.0	67.4	67.4	67.0	68.0	68.0	68.0	
67.0	4	25.8							35.0	64.4	64.3	65.1	65.1	65.2	65.2	
68.0	4	15.1							32.0	90.4	90.3	91.1	91.1	91.2	91.2	
69.0	3	-7.0							36.5	62.5	63.0	63.1	63.1	63.2	63.2	
70.0	2	-25.1							-25.0	72.0	80.2	80.0	80.3	80.3	80.3	

Positive is wind from the tail (270°).
Negative is wind from the head (90°).

HEAD AND TAIL WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 10.12

DATA SOURCE											DECEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	744	-10.0		-8.9	-6.6	-5.5		-4.0	-2.1	-0.1	+2.1	+4.1	+5.5	+6.5	+10.4	+11.0
1.0	744	-21.0		-15.9	-12.5	-10.4		-8.6	-5.8	-0.0	+6.9	+11.9	+14.1	+17.3	+19.9	+21.0
2.0	744	-16.0		-13.9	-9.6	-7.4		-5.7	-2.7	+2.9	+10.4	+16.5	+19.3	+22.8	+26.9	+35.0
3.0	744	-9.0		-8.9	-5.6	-4.2	-2.8	-0.5	+6.2	+13.8	+20.1	+23.7	+26.8	+34.9	+36.0	
4.0	744	-7.0		-6.9	-3.9	-2.2	-0.8	+1.6	+9.6	+17.8	+24.7	+28.3	+34.1	+38.9	+41.0	
5.0	744	-12.0		-10.9	-3.1	-1.5	-0.2	+3.9	+12.3	+21.6	+28.6	+34.0	+37.5	+45.9	+48.0	
6.0	744	-9.0		-6.9	-3.1	-0.6	+1.6	+6.2	+16.0	+25.2	+32.7	+37.0	+42.5	+48.9	+52.0	
7.0	744	-11.0		-10.9	-2.2	-0.1	+2.4	+7.8	+19.0	+29.5	+37.8	+43.1	+47.2	+53.9	+64.0	
8.0	744	-14.0		-8.9	-1.5	+0.9	+3.9	+9.7	+22.2	+35.1	+42.7	+48.0	+53.8	+59.9	+62.0	
9.0	744	-17.0		-16.9	-1.1	+1.4	+4.7	+11.4	+25.6	+40.0	+48.5	+54.5	+60.2	+64.9	+67.0	
10.0	744	-18.0		-16.9	-1.5	+2.4	+5.5	+12.4	+28.8	+44.1	+53.6	+61.0	+68.5	+72.9	+75.0	
11.0	744	-14.0		-12.9	-0.1	+2.7	+7.1	+14.6	+31.0	+47.6	+56.3	+62.0	+70.2	+77.9	+86.0	
12.0	744	-8.0		-3.9	+1.1	+3.9	+9.3	+17.4	+34.0	+49.8	+59.5	+66.5	+70.7	+95.9	+97.0	
13.0	744	-2.0		-0.9	+3.2	+8.1	+12.2	+19.2	+34.5	+48.4	+59.4	+64.3	+68.7	+79.9	+91.0	
14.0	744	-0.0		-1.0	+6.7	+8.9	+12.5	+19.1	+33.1	+45.7	+55.5	+60.6	+68.7	+76.9	+82.0	
15.0	744	-4.0		-0.9	+6.7	+8.9	+12.0	+17.8	+29.6	+40.9	+49.5	+54.0	+61.2	+67.9	+74.0	
16.0	744	-2.0		-1.9	+3.6	+6.5	+10.2	+14.9	+25.1	+33.9	+40.8	+45.6	+55.5	+59.9	+61.0	
17.0	744	-4.0		-3.9	+1.1	+3.6	+7.1	+11.5	+20.3	+28.0	+33.2	+38.0	+45.1	+53.9	+56.0	
18.0	744	-12.0		-5.9	-0.9	+0.0	+3.2	+7.6	+14.6	+23.0	+27.3	+30.0	+33.9	+38.9	+41.0	
19.0	744	-5.0		-2.9	-1.2	-0.1	+3.3	+8.9	+17.5	+23.2	+26.5	+30.1	+35.9	+37.0	+37.0	
20.0	744	-5.0		-3.5	-2.4	-0.9	+0.9	+1.1	+13.3	+20.4	+24.0	+27.5	+34.9	+36.0	+36.0	
21.0	744	-7.0		-6.4	-4.7	-2.4	-0.1	+5.5	+11.9	+17.4	+21.3	+28.5	+33.9	+35.0	+35.0	
22.0	744	-10.0		-8.9	-6.0	-3.4	-0.1	+5.7	+12.0	+16.8	+20.5	+22.8	+28.9	+30.0	+30.0	
23.0	744	-11.0		-8.5	-7.0	-3.8	+0.0	+6.0	+13.1	+18.9	+20.9	+24.3	+29.9	+35.0	+35.0	
24.0	744	-11.0		-9.8	-7.3	-4.4	+1.2	+8.2	+15.9	+21.4	+25.2	+28.7	+34.9	+37.0	+37.0	
25.0	744	-17.0		-14.9	-10.3	-7.4	+4.9	+2.8	+10.6	+18.5	+25.3	+27.8	+32.5	+37.9	+41.0	
26.0	744	-18.0		-17.9	-12.5	-8.7	+6.2	+2.9	+12.3	+20.7	+28.1	+31.5	+35.5	+37.9	+40.0	
27.0	744	-23.0		-21.9	-15.6	-12.2	+6.9	+3.6	+14.1	+22.7	+28.4	+32.8	+35.1	+41.9	+44.0	
28.0	132	-25.0		-16.7	-15.7	-12.2	+6.0	+5.4	+16.4	+25.3	+29.5	+30.7	+31.7	+35.7	+35.7	
29.0	134	-24.0		-19.7	-17.0	-11.4	+6.0	+5.0	+19.0	+26.4	+30.4	+34.0	+40.7	+46.0	+47.1	
30.0	134	-24.0		-19.4	-16.6	-15.3	+5.3	+5.1	+21.1	+28.4	+36.1	+38.0	+43.4	+49.5	+49.5	
31.0	140	-24.0		-21.6	-19.0	-18.3	+4.4	+4.4	+24.0	+31.9	+39.3	+43.0	+46.5	+49.0	+49.0	
32.0	141	-27.0		-24.4	-22.8	-20.5	+4.7	+4.7	+26.0	+36.1	+41.7	+45.0	+48.5	+51.0	+52.0	
33.0	141	-35.0		-26.4	-24.8	-21.2	+4.4	+4.4	+25.0	+39.1	+44.5	+52.0	+58.4	+60.4	+61.0	
34.0	141	-41.0		-31.4	-28.4	-20.3	+5.6	+5.6	+25.0	+43.4	+50.0	+57.0	+62.0	+65.0	+66.0	
35.0	141	-47.0		-35.4	-32.4	-19.5	+9.4	+9.4	+25.3	+47.2	+59.0	+62.3	+62.0	+67.4	+68.0	
36.0	141	-45.0		-30.4	-23.4	-21.0	+8.4	+8.4	+23.0	+44.7	+59.0	+61.0	+66.4	+71.4	+72.0	
37.0	141	-47.7		-44.4	-24.4	-23.5	+9.4	+9.4	+25.3	+51.3	+61.7	+67.4	+71.4	+72.2	+72.3	
38.0	141	-47.3		-42.4	-24.4	-21.0	+10.4	+10.4	+27.0	+54.4	+65.7	+70.4	+73.4	+80.0	+80.2	
39.0	142	-44.0		-41.4	-31.4	-27.4	+10.4	+10.4	+32.5	+55.4	+70.5	+73.0	+75.4	+79.0	+79.2	
40.0	142	-51.3		-40.4	-32.4	-29.4	+12.4	+12.4	+36.4	+57.2	+70.0	+75.0	+78.4	+79.7	+79.4	
41.0	142	-57.7		-42.4	-30.4	-25.0	+14.2	+14.2	+38.4	+59.0	+69.0	+74.8	+78.4	+80.0	+80.7	
42.0	140	-54.0		-45.4	-34.4	-24.0	+11.0	+11.0	+35.4	+61.3	+67.7	+75.0	+78.4	+80.0	+80.7	
43.0	134	-59.0		-41.4	-37.4	-24.1	+11.0	+11.0	+35.5	+61.5	+68.1	+73.0	+80.4	+85.1	+85.3	
44.0	140	-47.0		-40.4	-35.4	-26.5	+9.4	+9.4	+32.0	+62.7	+70.0	+75.0	+77.4	+84.0	+89.2	
45.0	134	-53.0		-41.4	-32.4	-24.1	+7.6	+7.6	+29.0	+65.7	+74.1	+78.0	+79.4	+89.2	+89.5	
46.0	137	-50.0		-44.4	-31.4	-21.1	+6.3	+6.3	+30.2	+71.3	+79.1	+80.0	+81.4	+90.6	+89.7	
47.0	138	-44.3		-44.4	-26.4	-19.1	+6.7	+6.7	+27.4	+73.1	+80.7	+83.0	+85.4	+92.1	+92.4	
48.0	136	-40.7		-36.4	-26.0	-15.2	+4.2	+4.2	+25.0	+74.1	+83.3	+84.0	+84.4	+92.4	+93.0	
49.0	130	-43.8		-35.7	-32.0	-15.5	+3.2	+3.2	+22.0	+75.4	+85.3	+87.4	+88.7	+92.5	+92.5	
50.0	127	-36.1		-34.7	-31.1	-14.6	+2.0	+2.0	+23.4	+75.0	+85.0	+90.1	+90.0	+96.4	+94.5	
51.0	122	-31.2		-29.0	-29.1	-19.0	+2.6	+2.6	+20.4	+74.8	+87.0	+91.1	+93.0	+101.1	+101.3	
52.0	115	-35.0		-29.4	-27.4	-24.2	+0.8	+0.8	+20.3	+75.4	+91.3	+97.0	+103.0	+105.5	+105.6	
53.0	110	-46.0		-31.0	-30.5	-22.5	+2.4	+2.4	+21.5	+74.5	+90.5	+100.2	+101.0	+120.1	+120.3	
54.0	102	-35.9		-34.0	-32.9	-22.9	+2.4	+2.4	+22.0	+74.4	+89.4	+99.7	+103.0	+130.4	+131.0	
55.0	92	-34.0		-33.9	-33.9	-25.4	+1.4	+1.4	+26.0	+76.4	+95.7	+99.0	+119.1	+119.7	+119.4	
56.0	81	-35.8		-32.2	-32.2	-18.4	+1.1	+1.1	+27.4	+74.1	+96.0	+117.2	+132.2	+132.4	+133.0	
57.0	57	-34.9		-34.5	-34.5	-18.6	+0.7	+0.7	+29.4	+74.7	+100.7	+107.4	+114.2	+114.5	+114.5	
58.0	51	-40.9		-34.5	-34.5	-19.4	+1.0	+1.0	+23.5	+74.0	+95.5	+104.0	+107.4	+107.0	+108.0	
59.0	34	-34.7		-29.0	-29.0	-21.1	+0.0	+0.0	+24.5	+74.4	+89.1	+125.1	+125.5	+125.4	+125.4	
60.0	22	-25.1		-29.0	-29.0	-22.9	+0.5	+0.5	+34.0	+69.5	+93.2	+141.7	+142.0	+142.3	+142.3	
61.0	15	-20.8							+2.4	+37.5	+90.4	+107.4	+104.0	+104.4	+104.5	
62.0	8	-1.0														
63.0	2	71.2														
64.0	1	83.7														

DATA SOURCE										ANNUAL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	8766	-13.0		-10.4	-7.7	-6.5	-5.3	-3.4	-0.7	+1.4	+3.5	+5.0	+6.4	+9.8	+12.0	
10	8766	-25.0		-17.8	-12.1	-10.3	-8.5	-5.4	-0.3	+5.7	+10.8	+14.1	+17.0	+21.6	+25.0	
20	8766	-25.0		-16.5	-10.8	-8.8	-6.8	-3.4	+1.3	+8.5	+14.9	+18.3	+21.9	+28.0	+35.0	
30	8766	-24.0		-16.3	-9.4	-7.4	-5.5	-2.2	+2.8	+11.7	+18.9	+22.9	+26.6	+35.0	+45.0	
40	8766	-25.0		-14.2	-8.8	-6.8	-4.9	-1.4	+4.2	+14.8	+23.1	+26.9	+31.3	+41.3	+49.0	
50	8766	-28.0		-15.0	-8.2	-6.6	-4.7	-1.0	+5.7	+18.5	+27.4	+31.7	+36.4	+46.5	+62.0	
60	8766	-27.0		-13.1	-8.9	-6.9	-4.7	-0.9	+7.3	+22.3	+31.8	+36.6	+41.5	+51.0	+70.0	
70	8766	-27.0		-15.3	-9.8	-7.3	-5.2	-0.8	+9.1	+25.9	+34.4	+42.2	+47.0	+59.1	+82.0	
80	8766	-26.0		-16.7	-10.3	-7.9	-5.5	-0.8	+11.1	+29.8	+41.2	+46.9	+53.3	+65.1	+91.0	
90	8766	-22.0		-16.9	-11.8	-9.3	-6.2	-0.8	+12.8	+33.9	+45.8	+53.8	+60.9	+74.1	+95.0	
100	8766	-23.0		-20.2	-13.7	-10.6	-7.2	-0.7	+15.0	+38.1	+51.2	+59.1	+66.5	+80.0	+103.0	
110	8766	-29.0		-22.4	-15.7	-12.2	-8.0	-0.6	+17.6	+41.8	+55.4	+63.5	+71.4	+85.0	+92.0	
120	8766	-32.0		-25.5	-17.9	-13.7	-8.9	-0.4	+20.0	+44.3	+57.5	+65.3	+72.7	+91.0	+98.0	
130	8766	-32.0		-26.5	-18.9	-14.4	-9.6	-0.3	+21.3	+44.3	+57.1	+63.8	+70.7	+85.0	+97.0	
140	8766	-31.0		-25.0	-17.1	-13.6	-9.4	-0.7	+20.5	+41.1	+52.8	+58.9	+65.0	+76.8	+88.0	
150	8766	-28.0		-22.0	-14.9	-12.0	-8.8	-1.7	+17.7	+36.1	+45.4	+52.3	+57.8	+69.0	+75.0	
160	8766	-21.0		-18.0	-12.9	-10.7	-8.3	-3.2	+13.3	+30.3	+38.9	+44.1	+49.2	+58.4	+68.0	
170	8766	-18.0		-15.7	-12.4	-10.9	-8.9	-4.8	+8.7	+24.4	+32.3	+36.9	+41.2	+50.5	+59.0	
180	8766	-19.0		-16.4	-13.3	-11.9	-10.3	-6.8	+4.2	+17.8	+25.0	+29.7	+33.5	+41.5	+51.0	
190	8766	-23.0		-17.8	-15.4	-13.9	-12.4	-9.0	+0.4	+11.5	+18.6	+23.3	+27.6	+35.5	+50.0	
200	8766	-31.0		-21.8	-18.7	-17.0	-15.1	-11.0	-1.1	+7.3	+13.7	+18.3	+22.2	+30.0	+41.0	
210	8766	-37.0		-24.5	-20.5	-18.8	-16.8	-12.5	-2.8	+5.4	+11.3	+14.8	+18.6	+26.6	+36.0	
220	8766	-39.0		-26.0	-21.7	-20.1	-18.2	-14.0	-3.7	+4.5	+10.3	+13.9	+17.6	+28.3	+46.0	
230	8766	-40.0		-26.4	-22.8	-21.2	-19.4	-15.1	-4.6	+4.4	+10.5	+14.4	+18.7	+28.0	+38.0	
240	8766	-40.0		-27.7	-24.4	-22.4	-20.5	-15.9	-4.8	+5.4	+11.9	+16.2	+19.7	+29.5	+39.0	
250	8766	-41.0		-30.0	-25.6	-23.7	-21.4	-16.9	-4.7	+6.8	+14.2	+18.6	+22.9	+32.3	+41.0	
260	8766	-35.0		-32.3	-26.9	-24.7	-22.4	-17.4	-4.4	+8.1	+16.8	+21.1	+26.2	+35.7	+50.0	
270	8766	-48.0		-33.0	-28.2	-25.9	-23.3	-18.1	-4.2	+9.7	+19.2	+23.2	+27.5	+38.5	+52.0	
280	1199	-31.3		-27.0	-26.4	-24.4	-22.4	-19.4	-4.3	+12.0	+21.4	+25.4	+29.4	+35.4	+47.1	
290	1224	-34.5		-31.7	-29.0	-27.4	-25.0	-19.8	-3.9	+14.0	+25.4	+29.4	+30.7	+40.3	+49.1	
300	1244	-34.0		-35.4	-29.5	-28.4	-25.5	-20.2	-3.2	+14.3	+27.5	+31.0	+34.0	+43.3	+49.6	
310	1262	-34.9		-37.3	-31.2	-29.0	-26.4	-20.6	-2.4	+21.3	+29.4	+36.0	+38.7	+46.3	+49.8	
320	1274	-40.4		-39.3	-32.1	-29.4	-27.1	-20.6	-0.9	+24.1	+33.3	+37.0	+41.4	+49.3	+52.0	
330	1293	-47.7		-42.2	-33.7	-30.4	-27.5	-20.7	-0.2	+26.4	+36.4	+40.4	+45.3	+54.2	+61.0	
340	1316	-54.8		-50.2	-34.5	-32.1	-24.1	-21.7	-0.3	+27.4	+39.0	+43.0	+48.4	+57.2	+66.0	
350	1330	-64.1		-53.2	-39.2	-34.4	-30.5	-22.4	0.3	+27.5	+40.5	+47.3	+52.7	+62.7	+68.0	
360	1333	-64.5		-55.2	-39.8	-34.1	-30.0	-25.0	0.1	+27.4	+42.1	+48.0	+55.7	+65.2	+72.0	
370	1339	-74.9		-57.2	-39.7	-35.0	-32.8	-25.3	0.3	+29.3	+44.0	+51.0	+59.2	+71.1	+72.3	
380	1344	-81.7		-59.2	-42.5	-38.0	-34.3	-25.0	0.4	+30.7	+45.4	+53.2	+61.4	+73.2	+80.2	
390	1355	-74.8		-70.4	-43.1	-39.6	-35.4	-27.2	-0.1	+32.4	+47.5	+56.1	+64.4	+75.2	+79.2	
400	1357	-85.4		-68.2	-44.5	-40.7	-37.3	-28.4	-0.9	+35.0	+49.3	+56.1	+65.5	+74.1	+78.4	
410	1357	-86.6		-67.2	-44.1	-43.3	-39.1	-30.1	-0.6	+35.3	+51.4	+59.9	+68.4	+74.2	+80.7	
420	1343	-83.0		-64.2	-44.0	-45.4	-41.0	-31.0	-1.2	+35.4	+54.1	+61.4	+69.4	+81.1	+81.4	
430	1338	-95.5		-64.2	-50.7	-47.1	-43.4	-34.5	-1.3	+37.5	+57.6	+63.9	+66.3	+80.2	+85.3	
440	1322	-94.0		-61.2	-53.3	-50.0	-46.0	-35.4	-0.7	+34.4	+59.4	+65.2	+69.9	+77.6	+89.2	
450	1305	-90.1		-65.2	-55.5	-52.5	-48.1	-36.5	-0.1	+40.5	+63.0	+70.1	+74.7	+85.2	+89.5	
460	1297	-90.7		-65.3	-56.8	-54.4	-49.3	-37.5	1.0	+41.4	+65.7	+74.6	+79.3	+89.4	+90.0	
470	1261	-84.3		-64.8	-60.0	-56.0	-50.6	-39.2	1.5	+43.2	+69.2	+77.0	+83.1	+92.1	+93.0	
480	1238	-80.3		-62.7	-59.0	-56.3	-51.4	-39.7	1.4	+44.4	+72.0	+81.7	+85.9	+92.4	+94.0	
490	1214	-65.4		-64.7	-59.6	-56.5	-52.2	-39.3	4.3	+45.9	+73.4	+84.2	+88.0	+96.4	+98.0	
500	1174	-66.1		-64.4	-61.1	-56.3	-53.3	-38.9	5.0	+49.2	+75.1	+85.9	+92.4	+102.4	+112.8	
510	1131	-77.5		-67.7	-62.0	-59.0	-53.9	-38.9	4.0	+40.2	+76.4	+84.4	+93.4	+103.5	+112.5	
520	1071	-80.3		-72.4	-64.1	-59.4	-54.4	-39.4	4.7	+40.5	+77.5	+84.4	+95.4	+105.4	+113.8	
530	1011	-82.0		-69.4	-65.4	-60.5	-54.6	-40.1	4.9	+52.2	+77.4	+86.0	+96.0	+112.6	+120.3	
540	924	-73.4		-64.7	-64.6	-60.4	-54.1	-41.5	5.7	+53.9	+76.2	+84.6	+99.7	+112.7	+131.0	
550	840	-74.3		-72.0	-64.1	-59.2	-54.8	-40.8	5.8	+54.4	+78.4	+85.0	+98.4	+107.4	+119.4	
560	743	-71.9		-71.0	-61.3	-60.4	-54.0	-41.4	6.3	+56.0	+78.4	+95.7	+100.4	+114.0	+133.0	
570	640	-70.0			-64.0	-60.5	-54.4	-41.5	6.5	+59.4	+82.0	+94.4	+107.3	+116.2	+117.4	
580	515	-72.7			-65.0	-63.1	-58.3	-41.7	6.3	+57.4	+80.3	+94.1	+104.4	+137.3	+137.9	
590	393	-71.2			-64.1	-64.1	-58.8	-41.4	9.2	+59.2	+83.2	+92.1	+104.1	+125.4	+125.4	
600	273	-75.6			-74.3	-64.6	-61.2	-45.0	7.5	+59.0	+87.4	+100.0	+106.4	+141.4	+142.3	
610	184	-82.9			-82.1	-78.4	-69.6	-50.8	5.0	+62.4	+86.3	+101.4	+107.1	+115.9	+116.3	
620	124	-91.8			-80.8	-77.2	-71.4	-54.1	0.0	+70.3	+84.4	+96.4	+119.0	+122.7	+122.4	
630	76	-87.5			-84.3	-83.1	-74.8	-54.0	4.5	+72.3	+91.1	+94.3	+106.2	+106.7	+106.4	
640	49	-84.0			-83.0	-70.5	-59.2	-39.2	2.5	+73.1	+87.4	+90.4	+129.4	+129.4	+129.7	
650	34	-72.9			-70.1	-70.1	-60.0	-45.0	-14.0	+55.0	+74.1	+76.1	+76.4	+76.0	+77.0	
660	29	-81.7				-57.4	-45.4	-31.5	56.4	+67.6	+68.4	+68.7	+69.0	+69.0	+69.0	
670	25	-113.1				-57.7	-53.0	-45.4	54.0	+64.0	+64.0	+64.0	+64.0	+64.0	+64.0	
680	20	-60.6				-56.5	-42.8	-30.5	110.4	+119.4	+124.4	+124.4	+124.4	+124.4	+124.4	
690	24	-45.0				-42.7	-29.0	-17.0	62.0	+115.7	+124.4	+123.7	+124.0	+124.0	+124.0	
700	25	-47.0				-42.7	-35.0	-1.5	73.0	+125.4	+127.0	+127.4	+124.0	+124.0	+124.0	

Positive is wind from the tail (270°)
Negative is wind from the head (90°)

DATA SOURCE											JANUARY							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)											
				LATITUDE	LONGITUDE													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967												
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967												
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																		
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	PERCENTAGE	FREQUENCY	84.000	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-11.0		-10.9	-9.1	-7.4		-6.4	-3.9	-0.9	+1.6	+3.9	+4.9	+6.3	+8.9	+10.0		
1.0	744	-16.0			-13.7	-11.2		-9.1	-5.6	-0.1	+5.8	+10.5	+14.5	+16.8	+19.9	+25.0		
2.0	744	-28.0		-26.9	-16.2	-12.0		-8.7	-5.0	+0.4	+6.4	+11.2	+13.6	+16.1	+19.9	+21.0		
3.0	744	-32.0		-31.9	-15.8	-13.0	-10.0	-5.3	+0.3	+7.0	+12.3	+16.5	+18.9	+27.9	+32.0			
4.0	744	-33.0		-29.9	-19.2	-14.6	-10.2	-5.2	+0.7	+8.0	+14.4	+17.6	+21.2	+31.9	+38.0			
5.0	744	-35.0		-30.9	-22.5	-16.8	-11.4	-5.2	+1.1	+8.7	+15.9	+21.0	+25.3	+33.9	+36.0			
6.0	744	-40.0		-33.9	-23.8	-18.0	-12.3	-5.4	+2.0	+9.9	+17.7	+23.0	+27.6	+37.9	+40.0			
7.0	744	-36.0		-35.9	-24.2	-19.7	-14.1	-5.6	+2.5	+11.8	+19.9	+26.5	+30.7	+37.9	+45.0			
8.0	744	-37.0		-36.9	-26.7	-22.5	-14.7	-6.5	+2.9	+13.3	+21.7	+30.0	+37.5	+43.9	+45.0			
9.0	744	-42.0		-38.9	-30.1	-22.0	-15.7	-7.2	+2.8	+14.6	+24.9	+32.0	+38.8	+49.9	+51.0			
10.0	744	-40.0		-37.9	-31.1	-23.0	-16.2	-7.1	+3.2	+15.8	+26.6	+32.7	+40.8	+47.9	+54.0			
11.0	744	-39.0			-31.2	-23.0	-17.7	-8.6	+3.4	+17.2	+28.1	+35.2	+39.7	+49.9	+51.0			
12.0	744	-46.0			-31.1	-24.0	-18.9	-9.0	+3.4	+17.4	+28.9	+33.5	+38.8	+50.9	+53.0			
13.0	744	-38.0			-33.9	-25.5	-21.0	-15.5	-6.7	+2.7	+15.7	+24.1	+29.5	+34.5	+42.9			
14.0	744	-26.0			-25.9	-21.2	-18.3	-13.5	-6.4	+2.5	+13.7	+21.2	+26.3	+29.5	+37.9			
15.0	744	-26.0			-25.9	-19.3	-17.0	-12.5	-6.0	+3.0	+12.5	+18.3	+22.3	+26.5	+33.4			
16.0	744	-26.0			-23.9	-16.7	-14.8	-10.8	-4.8	+2.4	+10.6	+15.2	+19.0	+21.8	+27.9			
17.0	744	-22.0			-20.9	-15.8	-12.8	-9.5	-4.7	+1.5	+9.0	+13.0	+15.8	+17.5	+26.9			
18.0	744	-19.0			-16.9	-12.5	-10.4	-8.2	-4.0	+0.9	+6.8	+10.4	+12.0	+14.3	+15.7			
19.0	744	-17.0			-14.9	-9.1	-7.9	-6.3	-3.2	+0.2	+4.6	+7.9	+10.4	+11.9	+13.9			
20.0	744	-15.0			-13.9	-8.8	-7.1	-5.5	-3.0	-0.1	+3.4	+6.0	+7.8	+9.7	+11.9			
21.0	744	-20.0			-18.9	-9.5	-7.8	-5.7	-2.8	-0.2	+2.6	+4.8	+6.6	+7.8	+12.9			
22.0	744	-17.0			-11.9	-8.6	-6.7	-4.9	-2.9	-0.3	+3.1	+5.9	+7.6	+10.3	+12.9			
23.0	744	-17.0			-11.9	-8.8	-6.9	-5.1	-2.8	-0.1	+3.5	+5.7	+8.0	+12.5	+15.9			
24.0	744	-15.0			-11.9	-9.3	-6.5	-5.2	-2.6	+0.0	+3.9	+6.4	+8.0	+9.5	+15.9			
25.0	744	-11.0				-9.5	-7.5	-5.5	-3.0	-0.0	+4.4	+7.4	+8.9	+10.5	+13.9			
26.0	744	-12.0				-10.3	-8.1	-6.2	-2.9	+0.1	+4.9	+8.2	+9.8	+12.2	+18.4			
27.0	744	-14.0		-12.9	-10.3	-8.0	-5.7	-2.7	+0.6	+5.8	+10.1	+11.9	+14.5	+26.9	+32.0			
28.0	105	-5.9				-5.4	-4.7	-0.4	+1.5	+4.4	+11.9	+15.4	+17.0	+22.9	+23.0			
29.0	107	-16.0			-10.0	-9.4	-5.7	-0.7	+0.1	+7.5	+13.2	+19.4	+15.0	+17.0	+17.2			
30.0	104	-16.0			-7.0	-6.5	-5.7	-0.4	+0.7	+10.5	+14.5	+17.4	+19.4	+19.7	+19.8			
31.0	103	-8.3				-5.5	-4.5	-0.1	+5.6	+11.5	+17.4	+19.4	+20.4	+20.7	+20.9			
32.0	113	-10.0				-8.0	-7.4	-4.4	-0.4	+4.0	+13.2	+19.1	+22.4	+23.4	+24.4			
33.0	115	-10.6				-8.4	-7.4	-2.6	+3.5	+12.7	+20.1	+21.2	+21.0	+26.1	+26.3			
34.0	117	-12.3				-8.4	-8.4	-4.4	+2.5	+11.4	+20.4	+23.0	+23.0	+26.0	+27.1			
35.0	116	-27.9			-23.4	-10.4	-8.4	-4.4	+3.4	+13.5	+20.1	+21.2	+21.0	+25.6	+25.7			
36.0	116	-21.4			-13.4	-12.4	-9.1	-5.0	+3.1	+12.0	+19.3	+21.2	+21.0	+22.3	+22.4			
37.0	114	-21.3			-12.0	-10.4	-8.9	-6.5	+2.9	+11.2	+19.4	+20.4	+21.0	+30.6	+30.7			
38.0	115	-21.9			-12.4	-11.4	-7.4	-3.2	+4.3	+12.4	+19.1	+23.4	+25.0	+26.8	+27.0			
39.0	117	-12.0				-11.4	-10.1	-3.4	+4.5	+14.2	+17.7	+24.7	+25.4	+25.8	+27.0			
40.0	115	-13.5			-13.4	-13.2	-9.4	-3.4	+4.8	+12.4	+20.4	+25.0	+25.0	+28.0	+28.2			
41.0	117	-22.0			-9.0	-9.2	-7.4	-1.0	+4.1	+13.4	+21.4	+26.4	+27.4	+32.0	+32.2			
42.0	114	-25.8			-11.0	-9.4	-6.1	-1.0	+4.3	+14.4	+23.4	+28.4	+35.0	+46.0	+46.1			
43.0	113	-16.5			-14.0	-11.7	-6.4	-2.6	+5.9	+16.7	+23.4	+31.0	+36.0	+45.1	+45.1			
44.0	113	-14.0			-12.0	-10.4	-7.3	-2.0	+7.4	+16.5	+27.4	+32.0	+33.0	+45.4	+45.4			
45.0	111	-14.0			-12.0	-10.7	-8.5	-1.4	+9.1	+19.5	+24.7	+34.0	+37.0	+49.0	+50.0			
46.0	110	-17.2			-15.0	-12.4	-9.7	-3.3	+10.3	+21.4	+26.4	+40.0	+43.0	+49.0	+50.0			
47.0	106	-14.7			-15.0	-14.3	-10.0	-2.2	+11.4	+24.1	+30.7	+46.4	+51.0	+59.0	+60.0			
48.0	104	-10.5			-19.0	-12.0	-10.4	-0.4	+11.4	+24.1	+30.7	+46.4	+51.0	+59.0	+60.0			
49.0	100	-20.3			-24.0	-14.4	-11.0	-0.1	+11.5	+24.1	+36.0	+48.4	+60.0	+61.0	+62.0			
50.0	100	-31.4			-31.0	-13.7	-12.0	-2.7	+12.6	+24.1	+38.4	+39.7	+43.0	+53.5	+53.6			
51.0	95	-37.4				-13.4	-10.2	-0.4	+12.1	+23.9	+33.4	+37.0	+43.1	+44.3	+44.4			
52.0	84	-42.8				-16.0	-12.6	-3.0	+10.0	+21.7	+31.6	+33.7	+37.1	+37.9	+38.0			
53.0	93	-44.1				-26.1	-12.0	-3.0	+10.3	+23.3	+31.4	+35.1	+36.2	+37.1	+37.2			
54.0	72	-30.4				-15.7	-14.4	-3.5	+11.0	+25.6	+35.2	+36.0	+39.2	+39.4	+39.9			
55.0	54	-20.0				-17.4	-14.4	-3.6	+10.3	+23.4	+30.4	+33.0	+40.5	+41.2	+41.3			
56.0	57	-20.9				-18.0	-14.1	-1.0	+10.4	+23.0	+34.2	+41.7	+43.4	+44.4	+44.5			
57.0	46	-26.2				-25.0	-22.7	-5.7	+10.4	+27.2	+32.7	+44.0	+47.4	+47.6	+47.6			
58.0	26	-31.1					-22.7	-5.9	+13.5	+28.0	+42.7	+50.4	+50.5	+50.7	+50.7			
59.0	14	-31.9						-15.1	+12.0	+29.1	+37.1	+37.7	+39.0	+38.2	+38.2			
60.0	10	-34.0						-24.4	+7.0	+27.4	+31.7	+32.1	+32.2	+32.3	+32.4			
61.0	7	-31.1						-7.0	+1.5	+32.7	+32.0	+32.0	+33.0	+33.0	+33.0			
62.0	6	-5.2							-2.0	+33.0	+33.5	+33.4	+33.4	+33.7	+33.7			
63.0	5	-2.3							+4.5	+33.3	+34.0	+34.0	+34.3	+34.3	+34.3			
64.0	4	-9.8							+0.0	+34.4	+34.4	+34.0	+35.0	+35.0	+35.0			
65.0	3	-4.6							+1.5	+25.3	+26.4	+26.4	+26.4	+26.5	+26.5			
66.0	3	-13.2							+1.6	+19.4	+19.7	+19.4	+19.4	+19.4	+19.4			
67.0	3	-15.8							+6.5	+14.7	+15.1	+15.2	+15.2	+15.3	+15.3			
68.0	4	-12.3							+6.0	+13.0	+14.2	+14.2	+14.4	+14.4	+14.4			
69.0	4	-6.4							+3.0	+12.5	+13.2	+13.4	+13.4	+13.4	+13.4			
70.0	4	-2.1							+5.0	+11.4	+11.9	+12.0	+12.1	+12.1	+12.1			

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA				EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)						
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM BBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	678	-13.0			-9.2	-7.6	-6.3	-3.6	-0.5	-2.7	+4.9	+6.5	+7.5	+12.0	+13.0	
1.0	678	-14.0			-11.8	-10.4	-8.2	-3.8	-1.0	-7.4	+13.0	+16.5	+18.6	+23.0	+24.0	
2.0	678	-17.0			-14.6	-12.3	-9.4	-3.7	-1.0	-6.8	+11.8	+15.5	+19.0	+23.0	+24.0	
3.0	678	-22.0			-17.0	-14.8	-9.6	-3.5	-1.1	-8.5	+13.0	+16.1	+18.6	+26.0	+27.0	
4.0	678	-24.0			-18.7	-14.7	-10.5	-3.7	-1.6	-9.4	+15.0	+17.1	+21.2	+33.0	+34.0	
5.0	678	-24.0			-21.2	-16.1	-11.7	-4.6	-2.3	-10.6	+16.6	+20.5	+23.6	+34.0	+35.0	
6.0	678	-25.0			-20.0	-16.5	-11.6	-4.8	-3.1	-11.9	+18.7	+23.1	+25.5	+34.0	+35.0	
7.0	678	-31.0			-22.2	-15.8	-11.5	-4.8	-3.0	-13.5	+20.3	+24.8	+28.7	+43.0	+44.0	
8.0	678	-32.0			-22.6	-17.3	-13.5	-5.3	-3.0	-14.5	+22.4	+26.4	+32.2	+44.0	+45.0	
9.0	678	-35.0			-25.2	-20.1	-13.6	-6.1	-2.9	-15.5	+24.4	+28.5	+36.2	+50.0	+51.0	
10.0	678	-45.0			-28.2	-21.5	-16.6	-7.4	-2.9	-16.5	+26.0	+31.8	+39.3	+48.0	+49.0	
11.0	678	-62.0			-32.2	-24.5	-17.0	-8.3	-2.9	-17.3	+27.6	+31.9	+39.2	+40.0	+61.0	
12.0	678	-56.0			-27.2	-24.2	-19.6	-8.5	-3.3	-18.0	+28.1	+30.7	+36.6	+55.5	+56.0	
13.0	678	-39.0			-26.2	-22.5	-16.4	-6.8	-3.3	-15.8	+25.3	+28.7	+31.4	+49.0	+50.0	
14.0	678	-46.0			-22.5	-19.5	-14.4	-7.0	-3.6	-14.2	+21.0	+25.2	+30.1	+42.0	+43.0	
15.0	678	-50.0			-19.6	-15.2	-12.1	-5.7	-2.8	-11.3	+17.3	+19.9	+24.0	+35.0	+36.0	
16.0	678	-36.0			-20.2	-13.7	-10.9	-4.6	-2.1	-10.2	+15.4	+18.3	+20.2	+26.0	+27.0	
17.0	678	-26.0			-18.2	-12.5	-9.4	-4.1	-1.5	-7.5	+12.7	+15.4	+17.4	+24.0	+25.0	
18.0	678	-22.0			-15.4	-11.1	-8.2	-3.1	-0.8	-6.0	+9.3	+11.5	+13.3	+18.0	+19.0	
19.0	678	-17.0			-10.8	-8.5	-6.1	-3.1	-0.0	-4.5	+7.5	+9.5	+11.1	+16.0	+17.0	
20.0	678	-12.0			-8.3	-6.9	-5.6	-3.1	-0.1	-3.6	+6.7	+8.5	+10.8	+15.0	+16.0	
21.0	678	-19.0			-14.2	-10.3	-6.8	-4.0	-0.4	-2.8	+5.7	+8.7	+10.2	+20.0	+21.0	
22.0	678	-33.0			-11.1	-8.3	-6.7	-3.8	-0.7	-2.2	+4.4	+6.3	+8.2	+15.0	+16.0	
23.0	678	-20.0			-10.7	-7.9	-5.9	-3.7	-0.6	-2.5	+4.9	+6.9	+9.1	+16.0	+17.0	
24.0	678	-13.0			-8.8	-7.3	-5.8	-3.6	-0.5	-2.2	+5.0	+7.7	+9.1	+21.0	+22.0	
25.0	678	-16.0			-10.1	-7.9	-5.9	-3.7	-0.6	-2.0	+4.3	+5.9	+7.4	+9.5	+10.0	
26.0	678	-17.0			-10.1	-7.8	-5.6	-3.5	-0.6	-2.3	+4.9	+7.0	+8.6	+13.0	+14.0	
27.0	678	-22.0			-8.0	-6.8	-5.6	-3.5	-0.6	-2.3	+5.0	+6.7	+9.1	+13.5	+14.0	
28.0	82	-4.9			-8.7	-8.0	-2.5	-1.1	1.4	5.4	7.1	8.2	8.4	8.4	8.9	
29.0	82	-7.7			-7.1	-5.9	-3.3	-0.7	4.4	7.0	8.4	12.2	12.0	13.0	13.0	
30.0	81	-9.0			-5.6	-2.0	-2.0	1.7	4.1	4.7	11.2	15.2	15.0	16.0	16.0	
31.0	81	-10.0			-8.2	-5.6	-2.0	3.4	4.1	10.0	12.2	13.2	13.0	14.0	14.0	
32.0	81	-10.0			-7.2	-6.3	-0.5	4.3	4.6	14.0	17.2	18.2	18.0	19.0	19.0	
33.0	81	-11.5			-8.0	-5.6	-3.3	1.0	5.0	9.4	13.0	14.1	14.0	15.0	15.0	
34.0	94	-12.2			-10.4	-9.3	-5.6	-0.5	5.0	8.3	9.4	13.1	13.4	13.4	13.4	
35.0	100	-16.3			-14.0	-13.0	-7.2	-0.2	5.2	10.7	11.0	13.6	14.2	14.3	14.3	
36.0	102	-18.1			-13.7	-10.8	-7.4	-0.2	5.2	10.0	10.0	12.0	13.7	13.9	13.9	
37.0	105	-16.2			-12.0	-11.0	-11.5	-7.3	-0.1	5.5	9.4	10.4	15.0	16.5	16.5	
38.0	107	-14.4			-13.0	-12.5	-10.0	-7.0	-0.1	5.0	9.7	10.4	15.0	16.5	16.5	
39.0	109	-20.9			-17.0	-14.4	-11.6	-6.0	0.5	5.7	10.5	14.5	17.6	19.3	19.4	
40.0	109	-18.8			-14.0	-12.4	-11.3	-7.6	0.6	4.1	11.2	14.5	16.0	25.1	25.2	
41.0	112	-17.0			-16.0	-15.6	-12.4	-7.8	2.7	10.2	14.2	17.7	30.9	31.8	32.0	
42.0	104	-21.5			-16.0	-13.5	-12.2	-7.2	3.5	12.1	16.2	19.5	23.0	31.0	32.0	
43.0	108	-24.9			-16.0	-14.5	-13.2	-6.6	5.0	13.0	18.7	22.5	23.0	35.6	35.7	
44.0	106	-20.3			-14.0	-17.3	-12.7	-5.1	5.7	14.1	22.0	34.4	36.0	40.3	40.5	
45.0	105	-16.4			-15.0	-14.5	-10.7	-2.4	7.8	17.5	21.4	27.4	44.0	51.0	52.1	
46.0	102	-12.1			-11.0	-9.8	-8.0	-2.0	7.0	19.3	23.6	30.7	55.0	60.8	61.0	
47.0	102	-9.0			-9.8	-7.4	-1.4	-1.4	7.0	20.6	26.4	33.7	54.0	59.0	59.1	
48.0	94	-13.3			-9.8	-8.1	-1.5	-1.5	6.4	17.7	24.1	32.0	45.0	45.0	45.1	
49.0	95	-20.4			-10.4	-9.4	-2.0	-2.0	7.2	18.0	24.1	31.4	36.1	37.1	37.2	
50.0	90	-32.6			-10.0	-7.5	-2.4	-2.4	7.0	17.0	23.4	30.0	34.1	35.1	35.2	
51.0	83	-41.1			-11.1	-7.0	-2.5	-2.5	7.4	15.0	25.0	35.1	36.2	37.2	37.4	
52.0	80	-46.7			-7.4	-6.7	-4.1	-4.1	7.0	14.1	26.0	36.0	37.2	37.4	37.9	
53.0	74	-51.2			-18.3	-6.6	-3.3	-3.3	7.2	21.7	28.4	32.4	43.3	43.0	44.0	
54.0	66	-57.4			-13.5	-6.6	-4.4	-4.4	6.4	22.3	31.7	35.4	45.4	46.0	46.1	
55.0	60	-54.0			-13.5	-10.0	-8.4	-8.4	10.0	27.2	33.0	37.4	43.4	44.4	44.5	
56.0	50	-50.5			-16.0	-12.5	-10.7	-10.7	7.0	23.5	35.4	40.0	41.4	41.0	42.0	
57.0	44	-61.1			-18.7	-10.7	-2.0	-2.0	9.5	23.0	35.4	41.0	47.5	47.0	48.0	
58.0	39	-56.2			-13.1	-12.8	-2.8	-2.8	9.5	21.0	24.7	37.1	37.4	37.7	37.7	
59.0	27	-25.1			-17.6	-1.0	-1.0	-1.0	14.7	32.7	37.2	37.4	37.4	37.5	37.5	
60.0	20	-25.7			-26.0	-2.2	-14.5	-14.5	23.4	37.0	42.4	42.5	42.6	42.6	42.6	
61.0	13	-21.1			0.1	15.0	25.0	25.0	41.3	41.3	41.4	41.7	41.9	41.9	41.9	
62.0	7	-24.3			4.1	11.3	14.0	14.0	27.7	27.7	27.0	28.0	28.1	28.1	28.1	
63.0	4	-2.8			12.0	34.5	34.5	34.5	34.1	34.2	34.2	34.4	34.4	34.4	34.4	
64.0	2	-2.7			15.0	15.7	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
65.0	1	4.5			7.0	9.5	9.5	9.5	9.7	9.7	9.7	9.7	9.7	9.7	9.7	
66.0	2	7.0			7.0	9.5	9.5	9.5	9.7	9.7	9.7	9.7	9.7	9.7	9.7	
67.0	1	14.0			14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
68.0	3	-16.0			14.5	46.4	46.4	46.4	46.4	46.4	46.4	46.7	46.7	46.7	46.7	
69.0	3	-3.0			4.5	21.5	21.5	21.5	21.4	21.0	22.0	22.0	22.0	22.0	22.0	
70.0	3	-32.3			14.5	17.5	17.5	17.5	17.4	17.0	18.0	18.0	18.0	18.0	18.0	

Positive is wind from the right (180°).
Negative is wind from the left (360°).

DATA SOURCE										MARCH					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE FREQUENCY 15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
SFC	744	-14.0	-12.9	-9.3	-7.6	-6.3	-3.6	-0.4	+2.6	+4.8	+6.2	+7.5	+10.9	+13.0	
10	744	-20.0	-14.9	-11.9	-10.2	-8.1	-4.4	+0.6	+6.7	+11.0	+13.1	+15.2	+19.4	+20.0	
20	744	-21.0	-16.9	-14.5	-9.8	-8.1	-4.2	+0.3	+5.9	+10.3	+12.6	+14.8	+19.9	+22.0	
30	744	-29.0	-21.9	-15.1	-10.1	-8.0	-4.7	+0.0	+6.5	+12.2	+14.5	+16.4	+19.9	+23.0	
40	744	-28.0	-20.9	-15.6	-11.3	-8.9	-5.6	-0.3	+6.8	+12.7	+17.0	+19.1	+23.9	+30.0	
50	744	-27.0	-25.9	-15.7	-13.1	-10.9	-6.1	-0.4	+6.9	+13.9	+17.5	+21.7	+29.9	+32.0	
60	744	-30.0	-26.9	-15.8	-13.4	-10.9	-6.4	-0.2	+7.9	+14.9	+19.0	+25.5	+32.9	+44.0	
70	744	-26.0	-25.9	-17.7	-15.5	-12.5	-7.3	-0.2	+8.8	+17.4	+21.0	+28.1	+44.9	+49.0	
80	744	-25.0	-24.9	-18.7	-16.8	-12.8	-8.2	-0.1	+10.1	+18.4	+23.3	+30.5	+38.9	+49.0	
90	744	-33.0	-29.9	-23.5	-19.7	-15.9	-9.7	-0.1	+12.5	+22.7	+31.0	+38.5	+51.9	+54.0	
100	744	-41.0	-39.9	-26.5	-23.4	-19.5	-11.6	-0.1	+12.5	+22.7	+31.0	+38.5	+51.9	+54.0	
110	744	-50.0	-45.9	-31.7	-28.0	-23.4	-12.8	-0.0	+12.4	+24.1	+34.0	+51.1	+55.9	+68.0	
120	744	-54.0	-44.9	-31.2	-27.6	-21.2	-12.4	-0.2	+13.9	+25.9	+32.0	+40.5	+60.9	+62.0	
130	744	-41.0	-38.9	-26.5	-21.8	-18.7	-10.3	-0.3	+12.6	+21.7	+28.2	+37.5	+49.9	+57.0	
140	744	-36.0	-30.9	-20.7	-18.2	-14.5	-9.2	-0.1	+9.6	+17.2	+23.0	+25.7	+38.4	+39.0	
150	744	-26.0	-22.9	-19.1	-16.1	-12.5	-7.5	-0.0	+9.2	+15.1	+18.6	+25.1	+33.9	+35.0	
160	744	-21.0	-16.1	-13.3	-10.9	-6.1	-0.2	+7.6	+13.6	+17.0	+20.7	+25.9	+40.0	+40.0	
170	744	-20.0	-18.9	-14.8	-12.2	-9.4	-5.3	-0.0	+6.3	+12.3	+16.5	+19.2	+24.4	+25.0	
180	744	-19.0	-12.2	-9.7	-7.7	-4.3	-0.3	+5.1	+9.6	+12.6	+16.1	+23.4	+24.0	+24.0	
190	744	-15.0	-14.9	-10.3	-8.2	-4.3	-3.7	-0.4	+3.3	+7.3	+10.6	+14.2	+19.9	+21.0	
200	744	-12.0	-11.9	-9.1	-7.4	-5.8	-3.3	-0.5	+2.4	+6.5	+9.2	+11.2	+15.9	+18.0	
210	744	-14.0	-13.9	-8.5	-6.9	-5.7	-3.4	-0.6	+2.3	+5.4	+7.4	+10.1	+13.9	+14.0	
220	744	-19.0	-12.9	-8.1	-7.3	-5.8	-3.5	-0.5	+2.3	+4.5	+6.0	+9.7	+16.9	+21.0	
230	744	-15.0	-14.9	-7.1	-7.1	-5.7	-3.4	-0.6	+1.7	+4.6	+7.0	+9.3	+14.9	+22.0	
240	744	-24.0	-18.9	-9.8	-6.9	-5.6	-3.5	-0.6	+1.8	+4.5	+6.8	+10.1	+15.9	+20.0	
250	744	-13.0	-12.9	-9.9	-8.2	-5.9	-3.6	-0.6	+1.8	+4.2	+5.8	+6.8	+9.9	+11.0	
260	744	-15.0	-13.9	-8.8	-8.0	-6.1	-3.5	-0.7	+1.6	+4.1	+5.5	+6.6	+9.9	+11.0	
270	744	-17.0	-13.9	-10.7	-8.6	-6.2	-3.7	-0.7	+1.8	+4.7	+6.0	+7.5	+9.9	+11.0	
280	80	-5.4	-4.0	-2.8	-2.8	-0.7	-0.7	2.5	6.5	8.5	9.0	10.1	10.4	10.5	
290	91	-2.6	-4.0	-3.4	-3.4	-1.3	-1.3	2.3	8.9	8.9	9.0	10.1	11.2	11.4	
300	97	-4.1	-4.0	-3.4	-3.4	-1.3	-1.3	2.3	8.9	8.9	9.0	10.1	11.2	11.4	
310	94	-10.4	-5.7	-5.0	-5.0	-2.2	-2.2	2.3	8.5	8.5	9.0	10.1	10.4	10.7	
320	101	-13.0	-8.4	-7.0	-7.0	-3.7	-3.7	1.0	5.7	9.4	11.0	12.0	14.0	15.0	
330	103	-13.7	-12.0	-8.4	-8.4	-5.1	-5.1	0.9	5.0	8.5	9.0	10.1	11.3	11.5	
340	103	-14.0	-8.0	-8.0	-8.0	-5.4	-5.4	0.4	5.4	9.3	10.7	13.4	14.1	14.2	
350	100	-26.2	-16.0	-10.5	-11.4	-6.7	-6.7	-1.4	5.5	8.4	11.0	14.0	14.7	14.8	
360	102	-13.4	-10.4	-7.0	-7.0	-3.7	-3.7	-1.2	5.4	11.5	13.4	14.0	14.5	14.6	
370	113	-17.0	-16.0	-15.4	-10.3	-6.4	-6.4	-1.2	5.4	12.4	17.0	17.0	14.7	14.8	
380	113	-23.8	-19.0	-10.2	-11.6	-7.7	-7.7	-1.2	6.0	12.6	13.5	14.0	14.7	14.8	
390	114	-26.1	-20.9	-19.4	-13.1	-8.7	-8.7	-0.5	5.4	12.3	13.4	16.0	17.7	17.4	
400	116	-23.1	-21.0	-19.4	-13.2	-8.7	-8.7	-1.3	5.5	13.1	14.0	16.4	22.4	25.0	
410	116	-32.8	-22.0	-22.2	-16.2	-8.6	-8.6	-0.9	5.0	13.0	17.0	21.4	24.0	24.4	
420	114	-27.3	-20.4	-17.4	-13.4	-8.4	-8.4	-1.2	7.5	14.2	18.0	24.4	33.7	33.4	
430	114	-16.9	-12.9	-11.4	-10.6	-7.7	-7.7	0.2	8.7	17.3	21.0	24.0	32.4	33.0	
440	113	-13.7	-12.0	-11.4	-9.2	-5.7	-5.7	1.5	10.0	16.4	21.0	26.9	27.4	28.0	
450	111	-14.7	-12.0	-11.5	-8.4	-4.3	-4.3	2.5	11.3	15.2	21.0	26.0	27.4	28.0	
460	110	-22.9	-10.0	-8.5	-7.5	-4.4	-4.4	3.3	12.2	15.0	14.5	22.0	23.5	23.5	
470	104	-14.1	-10.0	-8.5	-7.5	-4.4	-4.4	3.3	12.2	15.0	14.5	22.0	23.5	23.5	
480	107	-12.2	-11.0	-10.4	-6.5	-1.0	-1.0	5.1	12.2	14.7	25.4	28.0	32.1	32.3	
490	105	-14.6	-10.4	-14.6	-14.6	-5.0	-5.0	1.2	5.0	13.3	19.0	22.4	23.0	33.5	
500	102	-17.9	-15.0	-12.7	-6.4	-1.2	-1.2	5.0	13.3	19.0	22.4	23.0	33.5	33.5	
510	97	-16.0	-12.9	-9.1	-1.5	-1.5	-1.5	5.1	13.4	22.2	25.0	28.0	29.2	29.4	
520	94	-14.0	-11.0	-9.6	-3.4	-0.2	-0.2	13.0	19.7	23.0	36.0	36.7	36.4	36.4	
530	87	-20.0	-13.5	-10.9	-5.1	-3.3	-3.3	11.4	17.4	22.0	23.1	23.7	23.4	23.4	
540	90	-22.0	-15.2	-10.5	-5.8	-0.2	-0.2	0.4	16.0	19.0	21.1	21.5	21.5	21.5	
550	50	-24.0	-20.4	-10.6	-6.3	-3.5	-3.5	3.5	15.3	20.4	22.4	23.0	23.1	23.1	
560	50	-14.2	-9.6	-7.0	-4.4	-0.3	-0.3	11.2	15.3	16.0	19.6	20.4	20.5	20.5	
570	51	-14.4	-11.4	-7.7	-1.9	-7.5	-7.5	13.0	18.5	19.0	21.5	21.9	22.0	22.0	
580	41	-21.3	-7.0	-0.4	-0.4	-7.5	-7.5	15.5	19.0	30.0	30.4	30.5	30.7	30.7	
590	32	-14.9	-2.4	-1.5	10.3	18.6	18.6	18.6	26.4	43.4	43.7	48.0	48.0	48.0	
600	22	-13.2	-0.9	-5.5	11.7	25.5	25.5	25.5	29.0	49.0	49.4	50.0	50.1	50.1	
610	14	-3.5	-3.1	-4.0	33.4	49.2	49.2	49.2	49.4	49.4	49.7	49.4	49.4	49.4	
620	10	-5.1	2.6	15.0	30.4	39.7	39.7	39.7	40.1	40.2	40.4	40.4	40.4	40.4	
630	7	-3.7	-0.0	0.5	30.0	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	
640	5	1.0	17.5	31.2	31.7	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
650	4	5.0	6.4	7.3	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	
660	2	-5.9	-7.0	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	-5.5	
670	1	-17.4													
680	1	-4.4													
690	1	1.2													
700	1	-5.3													

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.4

DATA SOURCE							APRIL									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-12.0			-8.7	-7.4	-5.4	-2.7	-0.1	+2.3	+4.7	+5.6	+6.2	+10.0	+11.0	
1.0	720	-17.0			-12.2	-9.4	-7.7	-4.1	+0.2	+4.9	+8.5	+11.9	+13.9	+17.5	+18.0	
2.0	720	-18.0			-12.2	-9.7	-8.0	-4.7	-0.4	+3.9	+8.2	+10.8	+12.9	+16.0	+17.0	
3.0	720	-22.0			-16.9	-13.9	-10.4	-6.2	-0.7	+3.7	+7.8	+11.7	+13.2	+20.0	+21.0	
4.0	720	-25.0			-19.5	-16.2	-12.1	-7.0	-0.8	+3.8	+8.2	+10.6	+13.4	+21.0	+22.0	
5.0	720	-26.0			-16.8	-14.8	-12.8	-7.6	-0.9	+3.5	+8.5	+11.5	+14.9	+26.0	+27.0	
6.0	720	-32.0			-18.9	-16.8	-13.5	-8.2	-1.0	+4.0	+10.0	+13.3	+16.4	+20.0	+21.0	
7.0	720	-32.0			-22.7	-16.9	-14.7	-9.9	-2.0	+4.1	+10.1	+14.5	+17.6	+27.0	+28.0	
8.0	720	-36.0			-23.8	-19.5	-16.8	-10.6	-2.4	+4.1	+11.3	+14.9	+20.9	+26.0	+27.0	
9.0	720	-39.0			-27.7	-23.2	-19.3	-12.4	-2.8	+5.2	+12.7	+16.3	+22.9	+33.0	+34.0	
10.0	720	-40.0			-32.9	-27.5	-22.3	-14.3	-3.3	+6.0	+14.2	+19.5	+23.6	+36.0	+37.0	
11.0	720	-47.0			-36.8	-32.5	-25.7	-16.6	-4.0	+7.0	+16.5	+22.1	+24.9	+36.5	+37.0	
12.0	720	-52.0			-37.9	-34.1	-27.7	-17.9	-4.5	+7.6	+17.0	+22.2	+30.8	+39.0	+40.0	
13.0	720	-52.0			-36.5	-32.8	-26.4	-17.4	-4.4	+6.6	+17.0	+21.6	+25.1	+33.0	+34.0	
14.0	720	-37.0			-30.8	-28.3	-23.7	-15.5	-4.1	+6.1	+13.5	+17.7	+21.2	+26.0	+27.0	
15.0	720	-30.0			-24.2	-22.1	-19.0	-12.3	-3.5	+4.8	+10.7	+13.7	+18.9	+24.5	+25.0	
16.0	720	-27.0			-20.9	-18.6	-16.0	-10.9	-3.0	+3.8	+9.2	+12.5	+16.9	+24.0	+25.0	
17.0	720	-23.0			-18.2	-15.5	-12.9	-8.7	-2.5	+2.9	+7.4	+10.9	+15.4	+24.0	+25.0	
18.0	720	-18.0			-15.8	-12.6	-10.5	-7.2	-2.0	+1.9	+5.9	+8.1	+11.4	+15.0	+16.0	
19.0	720	-14.0			-12.2	-10.2	-7.8	-5.0	-1.3	+1.5	+4.9	+7.1	+8.9	+19.5	+20.0	
20.0	720	-23.0			-10.8	-8.5	-6.9	-4.4	-0.9	+1.7	+5.1	+6.9	+8.9	+12.0	+13.0	
21.0	720	-16.0			-9.5	-7.6	-6.0	-4.0	-1.0	+1.2	+3.1	+4.7	+6.8	+10.0	+11.0	
22.0	720	-15.0			-7.7	-6.7	-5.8	-3.7	-0.8	+1.3	+3.5	+4.5	+5.9	+8.0	+9.0	
23.0	720	-13.0			-8.3	-7.1	-5.7	-3.6	-0.8	+1.3	+3.1	+3.9	+5.3	+8.0	+9.0	
24.0	720	-11.0			-8.2	-6.8	-5.6	-3.7	-0.9	+1.1	+3.3	+4.5	+5.7	+13.0	+14.0	
25.0	720	-10.0			-8.7	-7.2	-5.8	-3.7	-0.9	+1.1	+3.3	+4.6	+6.2	+8.6	+9.0	
26.0	720	-12.0			-8.3	-6.2	-5.5	-3.5	-0.9	+1.2	+3.0	+4.4	+5.7	+10.0	+11.0	
27.0	720	-12.0			-9.4	-7.5	-5.9	-3.7	-0.8	+1.3	+3.5	+4.7	+5.9	+7.7	+8.0	
28.0	94	-0.2			-6.4	-3.0	-1.0	-0.7	3.4	7.4	8.0	12.0	12.5	12.5	12.5	
29.0	94	-0.2			-5.0	-4.7	-1.5	1.0	4.3	6.7	7.6	9.0	9.0	9.0	10.1	
30.0	103	-4.9			-7.0	-5.0	-5.4	-2.8	1.4	4.4	7.2	7.0	9.0	11.2	11.4	
31.0	107	-6.9			-6.0	-6.3	-6.5	-2.6	1.2	4.4	7.0	9.5	10.0	10.0	11.0	
32.0	106	-9.0			-9.0	-7.5	-6.7	-3.8	0.2	4.5	6.6	8.3	8.0	9.3	9.4	
33.0	104	-17.0			-13.4	-9.4	-8.3	-3.9	-0.1	3.4	7.7	8.0	8.0	9.1	9.1	
34.0	104	-17.0			-12.5	-12.7	-10.5	-7.4	-0.4	4.0	5.4	7.6	8.0	13.0	14.0	
35.0	110	-17.8			-14.0	-13.7	-10.5	-7.4	-0.4	3.4	5.5	9.5	10.6	11.2	11.3	
36.0	112	-19.2			-15.0	-15.2	-12.5	-8.0	-1.1	4.3	5.8	7.0	7.3	8.2	8.2	
37.0	112	-20.0			-19.5	-18.2	-14.2	-9.0	-1.0	4.8	6.3	7.0	7.0	8.4	8.9	
38.0	114	-20.0			-14.0	-17.4	-15.3	-8.4	-0.8	5.2	8.7	9.4	10.0	11.0	11.2	
39.0	112	-19.4			-16.0	-15.5	-13.5	-7.7	-0.5	4.5	11.1	11.0	12.5	13.1	13.2	
40.0	112	-18.3			-15.0	-14.5	-12.5	-8.0	-2.0	5.5	10.3	10.0	11.3	11.7	11.8	
41.0	113	-16.3			-12.0	-11.7	-10.4	-7.3	-0.2	5.5	8.7	10.0	13.4	13.4	13.4	
42.0	112	-14.9			-13.0	-13.2	-11.2	-5.5	-0.3	5.2	9.4	12.2	12.2	14.7	14.2	
43.0	112	-20.8			-14.0	-14.7	-10.8	-4.6	1.3	6.7	9.2	12.5	14.2	17.2	17.4	
44.0	111	-22.0			-14.0	-15.5	-10.4	-3.4	2.1	9.7	14.5	17.7	19.5	20.0	20.1	
45.0	110	-16.5			-15.5	-16.2	-8.2	-3.4	2.2	9.3	14.5	17.7	19.5	20.6	20.7	
46.0	107	-15.8			-15.7	-14.8	-6.0	-3.0	4.2	11.0	18.3	17.5	19.0	20.6	20.7	
47.0	105	-14.0			-16.0	-13.0	-10.7	-4.2	4.2	11.4	18.2	19.0	21.0	24.0	25.0	
48.0	103	-17.2			-16.0	-12.7	-10.3	-3.8	3.1	10.3	18.4	16.7	25.0	26.0	26.0	
49.0	103	-14.8			-14.7	-10.9	-4.2	2.0	9.3	16.0	17.0	18.4	19.1	19.1	19.1	
50.0	100	-11.9			-12.0	-10.7	-9.0	-3.1	2.5	9.4	14.5	16.0	20.0	21.0	22.0	
51.0	100	-13.0			-13.0	-10.7	-7.0	-3.4	3.3	9.5	13.4	16.7	18.0	19.0	20.0	
52.0	94	-13.1			-8.0	-8.1	-3.1	-3.1	3.7	10.5	14.6	16.0	18.0	19.0	19.0	
53.0	92	-0.4			-8.0	-7.3	-3.0	-3.0	4.4	9.3	13.4	16.5	19.1	20.0	20.2	
54.0	80	-10.5			-9.2	-6.5	-2.6	-3.4	4.5	10.6	14.0	17.4	20.2	20.0	21.0	
55.0	75	-13.7			-10.4	-7.9	-3.4	-3.4	4.4	10.6	13.4	14.4	20.2	20.7	20.7	
56.0	63	-11.4			-11.8	-8.7	-4.0	-4.0	11.4	18.7	17.8	19.5	19.0	20.0	20.1	
57.0	52	-15.4			-15.0	-12.7	-7.7	-2.7	11.0	17.7	21.0	27.3	27.5	27.6	27.6	
58.0	46	-15.2			-11.2	-8.7	-4.2	4.1	13.4	19.3	23.1	23.3	23.5	23.5	23.5	
59.0	36	-14.8			-3.5	-3.5	-3.5	4.5	13.4	17.4	24.4	24.7	29.0	29.0	29.0	
60.0	26	-25.5			-2.8	-2.8	-2.8	4.0	11.4	15.4	15.7	15.9	15.0	15.0	15.0	
61.0	14	-19.4			-3.3	-3.3	-3.3	12.0	22.5	23.0	23.2	23.2	23.3	23.3	23.3	
62.0	4	2.2			-1.0	-1.0	-1.0	14.0	34.2	34.4	34.6	34.6	34.6	34.6	34.6	
63.0	4	4.3			-1.0	-1.0	-1.0	14.0	16.4	16.4	16.4	16.4	17.0	17.0	17.0	
64.0	4	-24.3			-17.0	-17.0	-17.0	-17.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	
65.0	2	-17.1			-4.0	-4.0	-4.0	-4.0	1.7	2.0	2.0	2.0	2.1	2.1	2.1	
66.0	2	-5.9			-3.0	-3.0	-3.0	-3.0	8.4	8.5	8.5	8.5	8.5	8.5	8.5	
67.0	2	-3.1			-14.0	-14.0	-14.0	-14.0	-3.1	-2.3	-2.3	-2.3	-2.4	-2.4	-2.4	
68.0	2	-13.7			-12.0	-12.0	-12.0	-12.0	7.5	7.6	7.6	7.6	7.6	7.6	7.6	
69.0	2	-11.9			-17.0	-17.0	-17.0	-17.0	13.7	13.0	13.0	13.0	14.0	14.0	14.0	
70.0	2	-16.5														

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.5

DATA SOURCE							MAY											
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)											
				LATITUDE	LONGITUDE													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967												
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967												
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																		
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED (DEG)	DIR (DEG)
5FC	744	-9.0																
1.0	744	-15.0		-14.9	-9.2	-8.1	-6.4	-3.2	-0.1	2.1	3.7	6.7	9.3	11.9	14.0	16.0	17.0	
2.0	744	-17.0		-15.9	-11.8	-9.0	-7.5	-4.5	-0.6	3.2	5.9	8.1	9.5	11.9	17.0	16.0	17.0	
3.0	744	-18.0		-15.9	-11.9	-9.8	-8.1	-4.8	-0.7	2.8	6.9	10.2	11.9	15.4	16.0	17.0	17.0	
4.0	744	-19.0		-18.9	-12.6	-10.6	-8.8	-5.5	-0.8	3.5	7.9	10.6	14.2	18.4	19.0	20.0	20.0	
5.0	744	-19.0		-18.9	-14.3	-12.3	-9.8	-6.2	-0.7	3.9	8.0	10.6	14.2	18.4	20.0	20.0	20.0	
6.0	744	-20.0		-19.9	-15.9	-14.0	-11.6	-7.1	-0.9	9.4	9.1	11.7	15.5	22.9	27.0	27.0	27.0	
7.0	744	-23.0		-21.9	-18.8	-15.8	-12.9	-7.6	-0.8	4.9	10.5	13.7	19.1	29.9	31.0	31.0	31.0	
8.0	744	-25.0		-23.9	-20.8	-18.3	-14.9	-8.8	-0.7	6.0	12.3	17.0	24.9	37.0	37.0	37.0	37.0	
9.0	744	-27.0		-26.9	-23.1	-21.0	-17.4	-10.8	-0.8	7.3	14.7	20.0	29.5	40.0	40.0	40.0	40.0	
10.0	744	-27.0		-26.9	-24.1	-20.3	-11.3	-11.4	-0.9	8.3	17.5	23.0	39.4	40.0	40.0	40.0	40.0	
11.0	744	-37.0		-36.9	-32.2	-28.0	-21.9	-13.4	-1.6	10.1	20.8	25.6	31.7	41.9	43.0	43.0	43.0	
12.0	744	-41.0		-39.9	-34.7	-31.0	-24.2	-15.3	-1.7	11.3	21.4	27.5	33.5	42.9	44.0	44.0	44.0	
13.0	744	-46.0		-44.9	-37.5	-30.6	-24.9	-16.7	-2.9	9.9	19.8	24.3	27.6	37.4	38.0	38.0	38.0	
14.0	744	-43.0		-42.9	-33.5	-27.0	-21.9	-15.5	-2.8	7.4	15.7	20.6	24.5	38.9	43.0	43.0	43.0	
15.0	744	-30.0		-28.9	-24.8	-21.2	-18.6	-12.8	-4.0	5.8	11.4	14.6	17.8	27.4	28.0	28.0	28.0	
16.0	744	-20.0				-18.2	-15.3	-10.6	-4.1	3.9	8.7	10.6	12.8	16.6	17.0	17.0	17.0	
17.0	744	-19.0		-17.9	-15.5	-14.1	-12.8	-9.2	-3.2	2.2	6.2	8.1	9.5	11.9	14.0	14.0	14.0	
18.0	744	-17.0		-14.9	-12.9	-11.4	-9.9	-7.0	-2.5	1.2	4.1	5.6	7.7	12.4	13.0	13.0	13.0	
19.0	744	-18.0		-13.9	-9.9	-7.9	-7.3	-5.3	-1.5	1.1	2.9	4.0	4.9	6.4	7.0	7.0	7.0	
20.0	744	-11.0			-8.5	-7.4	-6.1	-4.1	-1.2	0.7	2.4	3.7	4.7	6.4	7.0	7.0	7.0	
21.0	744	-9.0		-8.9	-6.7	-5.8	-5.0	-3.4	-0.8	0.9	2.8	4.0	4.7	6.4	7.0	7.0	7.0	
22.0	744	-9.0			-7.2	-6.3	-5.1	-3.2	-0.8	0.8	2.9	3.9	5.5	6.9	7.0	7.0	7.0	
23.0	744	-8.0		-7.9	-6.7	-6.0	-4.9	-3.1	-0.7	1.0	2.9	4.0	5.2	6.4	7.0	7.0	7.0	
24.0	744	-8.0			-7.0	-5.9	-5.0	-3.2	-0.7	1.0	3.4	4.5	5.8	6.9	7.0	7.0	7.0	
25.0	744	-13.0		-10.9	-7.7	-6.5	-5.4	-3.3	-0.8	1.2	3.4	4.6	5.6	6.4	7.0	7.0	7.0	
26.0	744	-15.0		-14.9	-8.8	-6.8	-5.1	-3.2	-0.7	1.3	3.2	4.4	5.4	6.4	7.0	7.0	7.0	
27.0	744	-12.0		-11.9	-8.6	-6.6	-5.4	-3.7	-0.7	1.4	3.0	4.3	5.5	6.4	7.0	7.0	7.0	
28.0	103	-6.0			-6.0	-5.6	-4.7	-2.9	0.9	3.4	4.6	5.7	6.5	6.9	7.0	7.0	7.0	
29.0	105	-7.7			-7.7	-6.4	-4.8	-3.0	0.7	4.2	5.9	7.2	7.7	8.0	9.1	9.1	9.1	
30.0	105	-6.8			-6.7	-5.4	-4.8	-3.0	0.7	4.2	5.9	7.2	7.7	8.0	9.1	9.1	9.1	
31.0	107	-12.5			-6.7	-5.4	-4.8	-3.0	0.7	4.2	5.9	7.2	7.7	8.0	9.1	9.1	9.1	
32.0	110	-10.0			-9.0	-8.7	-7.2	-3.9	0.4	4.0	7.2	8.4	10.0	10.9	11.0	11.0	11.0	
33.0	112	-14.0			-11.0	-10.5	-7.6	-4.0	-0.1	3.6	7.4	10.6	13.0	19.8	20.0	20.0	20.0	
34.0	113	-12.0			-9.0	-8.2	-7.6	-5.0	-0.4	3.6	7.7	9.7	10.9	11.5	11.5	11.5	11.5	
35.0	113	-12.0			-11.0	-11.2	-8.3	-4.0	-0.9	4.0	7.2	8.7	9.9	13.4	13.5	13.5	13.5	
36.0	113	-14.0			-11.0	-10.7	-8.2	-5.0	-0.8	3.9	6.3	9.0	11.0	11.0	12.0	12.0	12.0	
37.0	114	-16.7			-10.0	-10.2	-8.1	-4.0	-0.7	5.1	7.6	9.0	10.0	11.7	11.9	11.9	11.9	
38.0	112	-14.0			-10.0	-10.2	-7.7	-4.0	-0.4	4.6	7.2	9.0	9.9	12.4	12.9	12.9	12.9	
39.0	112	-14.0			-11.0	-8.7	-8.5	-5.2	-0.1	4.1	6.4	7.8	8.0	20.1	20.3	20.3	20.3	
40.0	115	-15.0			-13.4	-8.0	-8.6	-5.1	-0.5	4.3	7.1	9.0	10.0	16.5	16.5	16.5	16.5	
41.0	116	-22.0			-14.8	-12.4	-10.2	-5.1	-0.5	4.4	7.2	9.0	9.0	10.4	10.5	10.5	10.5	
42.0	116	-0.3			-8.4	-7.1	-7.1	-4.5	0.1	4.6	7.7	9.0	11.0	14.1	14.3	14.3	14.3	
43.0	113	-0.2			-9.0	-8.5	-7.2	-4.3	0.9	5.6	8.4	14.0	19.4	20.3	20.4	20.4	20.4	
44.0	112	-13.6			-9.0	-8.5	-6.4	-2.8	1.0	5.5	10.5	11.5	12.0	17.1	17.3	17.3	17.3	
45.0	111	-10.9			-9.0	-8.7	-7.6	-3.6	2.4	8.4	11.2	14.2	14.0	20.9	21.0	21.0	21.0	
46.0	104	-10.8			-10.8	-10.3	-8.3	-2.5	3.6	8.6	13.3	15.7	16.0	20.1	20.3	20.3	20.3	
47.0	107	-16.1			-10.0	-8.0	-7.9	-2.0	4.0	9.4	13.7	14.4	19.0	22.4	22.6	22.6	22.6	
48.0	106	-14.5			-16.0	-13.4	-8.4	-3.5	4.0	9.4	13.7	16.4	17.0	21.9	22.1	22.1	22.1	
49.0	104	-21.4			-19.0	-17.6	-9.0	-5.2	3.0	8.6	12.4	14.0	17.0	17.4	17.7	17.7	17.7	
50.0	100	-21.9			-22.0	-15.7	-10.0	-3.4	4.4	9.7	15.0	15.0	15.4	16.0	16.0	16.0	16.0	
51.0	94	-16.2				-13.4	-11.7	-2.1	5.3	9.9	13.1	14.4	20.0	20.6	20.7	20.7	20.7	
52.0	95	-16.0				-12.4	-11.1	-5.0	4.0	11.0	14.6	16.4	19.0	19.8	19.9	19.9	19.9	
53.0	90	-16.0				-14.5	-11.7	-4.0	4.0	10.6	14.4	19.0	21.1	21.6	21.7	21.7	21.7	
54.0	85	-14.9				-13.1	-11.7	-2.4	3.4	10.2	15.0	22.1	33.1	33.7	33.4	33.4	33.4	
55.0	74	-23.6				-15.3	-11.3	-4.1	3.4	10.4	17.1	17.0	22.2	22.7	22.8	22.8	22.8	
56.0	56	-27.5				-14.5	-10.4	-5.5	2.4	13.1	18.4	19.4	20.4	20.9	21.0	21.0	21.0	
57.0	57	-51.0				-12.1	-12.1	-3.0	3.6	12.0	19.2	21.7	23.4	23.4	24.0	24.0	24.0	
58.0	43	-40.8				-13.4	-13.4	-5.4	2.9	12.9	19.9	20.9	21.1	21.3	21.4	21.4	21.4	
59.0	3	-27.1				-15.7	-10.0	-3.4	4.4	9.7	15.0	15.0	15.4	16.0	16.0	16.0	16.0	
60.0	20	-27.0					-27.0	-9.4	4.5	11.8	16.0	21.4	21.4	22.0	22.0	22.0	22.0	
61.0	12	-12.3						-9.1	-1.0	11.1	15.3	15.4	15.4	15.9	15.9	15.9	15.9	
62.0	9	-19.6						-8.4	-5.4	4.6	7.6	7.6	8.0	8.0	8.1	8.1	8.1	
63.0	2	-10.2							-10.0	1.5	1.7	1.7	1.9	1.9	1.9	1.9	1.9	
64.0	2	-15.2							-15.0	-0.4	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	
65.0	2	-20.2							-20.0	-2.3	-2.1	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
66.0	1	-24.3																-24.3
67.0	1	-4.0																-4.0
68.0	1	-4.0																-4.0
69.0	1	7.1																7.1
70.0	1	15.0																15.0

Positive is wind from the right (180°).
Negative is wind from the left (360°).

DATA SOURCE										JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	CUMULATIVE 2.280	5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
SFC	720	-8.0		-6.1	-3.9	-3.0	-1.1	-0.0	+2.4	+7.0	+5.2	+6.3	+9.0	+10.0		
100	720	-11.0		-6.9	-5.8	-4.4	-1.7	+0.7	+4.1	+7.0	+9.4	+10.7	+18.0	+19.0		
200	720	-13.0		-6.9	-5.9	-4.6	-2.5	-0.0	+3.7	+6.4	+8.6	+10.9	+21.0	+22.0		
300	720	-12.0		-7.7	-6.5	-4.8	-2.7	-0.1	+3.4	+6.6	+8.7	+12.2	+22.0	+23.0		
400	720	-12.0		-7.7	-6.5	-4.9	-2.9	-0.3	+3.2	+7.0	+9.1	+12.4	+22.0	+23.0		
500	720	-12.0		-7.7	-6.6	-5.6	-3.5	-0.4	+3.1	+6.7	+9.2	+10.9	+23.0	+24.0		
600	720	-11.0		-8.9	-7.8	-6.5	-4.2	-0.7	+3.2	+6.7	+9.5	+10.8	+24.0	+25.0		
700	720	-13.0		-10.4	-8.7	-6.9	-4.6	-0.9	+3.5	+7.3	+9.5	+12.2	+24.0	+25.0		
800	720	-17.0		-11.9	-9.9	-8.6	-5.2	-0.9	+4.1	+8.5	+10.6	+13.5	+25.0	+26.0		
900	720	-14.0		-14.5	-12.9	-11.0	-6.7	-0.8	+5.5	+9.8	+12.1	+14.6	+23.0	+24.0		
1000	720	-25.0		-17.9	-15.7	-13.7	-7.9	-1.0	+6.6	+11.7	+14.9	+17.9	+23.5	+24.0		
1100	720	-30.0		-23.7	-18.4	-15.8	-9.6	-1.3	+7.4	+14.0	+17.4	+19.8	+32.0	+33.0		
1200	720	-30.0		-27.8	-22.1	-18.7	-12.2	-2.2	+7.9	+14.8	+19.1	+23.8	+35.0	+36.0		
1300	720	-31.0		-28.6	-24.6	-21.1	-13.2	-3.3	+7.1	+14.5	+18.9	+23.2	+36.0	+37.0		
1400	720	-33.0		-28.7	-23.2	-19.9	-12.7	-4.5	+3.7	+9.9	+12.9	+18.8	+29.0	+30.0		
1500	720	-27.0		-24.4	-20.9	-17.2	-11.9	-5.0	+1.0	+5.5	+7.8	+9.8	+15.0	+16.0		
1600	720	-21.0		-17.5	-15.1	-12.6	-9.2	-4.4	+0.2	+3.3	+5.8	+7.5	+9.6	+10.0		
1700	720	-16.0		-13.8	-11.9	-9.6	-6.7	-3.1	-0.0	+2.5	+4.1	+5.5	+10.0	+11.0		
1800	720	-11.0		-9.7	-8.6	-7.3	-5.2	-2.2	-0.0	+2.0	+3.4	+4.6	+5.8	+6.0		
1900	720	-13.0		-7.9	-6.7	-5.8	-3.8	-1.3	+0.5	+2.5	+3.6	+4.5	+6.0	+7.0		
2000	720	-15.0		-7.6	-6.6	-5.3	-3.4	-1.0	+0.5	+2.1	+3.3	+4.4	+6.0	+7.0		
2100	720	-15.0		-6.8	-5.9	-4.8	-3.1	-0.8	+0.9	+2.6	+3.7	+4.6	+7.0	+8.0		
2200	720	-13.0		-7.8	-6.7	-5.7	-3.5	-0.5	+1.5	+3.3	+4.3	+5.1	+6.0	+7.0		
2300	720	-14.0		-7.9	-6.6	-5.2	-3.3	-0.6	+1.5	+3.3	+4.2	+5.1	+7.0	+8.0		
2400	720	-12.0		-7.5	-6.2	-4.9	-3.0	-0.6	+1.1	+2.7	+3.6	+4.9	+7.5	+8.0		
2500	720	-12.0		-7.6	-6.5	-5.3	-3.2	-0.7	+0.8	+2.7	+3.6	+4.6	+7.0	+8.0		
2600	720	-10.0		-7.3	-6.3	-5.3	-3.6	-0.7	+1.1	+3.0	+4.5	+5.9	+12.0	+13.0		
2700	720	-10.0		-7.9	-7.2	-5.5	-3.6	-0.8	+0.9	+2.7	+3.8	+4.8	+8.0	+9.0		
2800	100	-5.9		-5.8	-4.8	-3.5	-1.5	0.0	2.5	4.0	4.0	5.5	6.1	6.2		
2900	104	-10.8		-8.0	-4.7	-4.0	-2.8	-0.3	2.1	5.1	6.1	6.7	6.0	6.9		
3000	107	-6.9		-6.0	-6.1	-4.0	-2.7	0.5	3.0	5.5	6.5	7.0	7.0	7.5		
3100	108	-6.3		-6.0	-5.1	-4.2	-2.9	1.0	3.4	5.0	6.8	7.5	7.4	8.0		
3200	109	-9.0		-8.0	-7.5	-5.6	-3.1	1.1	4.4	5.0	7.0	9.2	12.5	12.5		
3300	109	-7.0		-5.0	-4.4	-2.8	0.4	0.4	3.8	5.0	6.6	7.0	7.0	8.0		
3400	110	-6.0		-5.0	-5.1	-3.1	0.4	0.4	3.5	5.5	6.0	7.0	10.0	11.0		
3500	111	-11.3		-8.0	-7.6	-6.7	-4.0	-0.7	3.4	6.3	6.0	8.0	9.5	9.5		
3600	111	-0.1		-7.0	-7.1	-5.1	-0.4	-0.4	3.5	6.0	8.0	9.0	10.7	10.4		
3700	110	-10.0		-8.0	-7.7	-7.2	-5.1	-0.5	4.6	6.8	9.7	10.5	10.0	11.0		
3800	110	-9.9		-8.0	-7.8	-6.0	-0.0	-0.3	5.1	7.0	9.0	11.0	13.3	13.5		
3900	110	-11.0		-9.0	-8.2	-8.2	-0.8	0.1	8.0	8.1	8.0	10.0	12.0	13.0		
4000	110	-14.0		-10.0	-9.5	-7.0	-0.4	-0.3	5.1	7.6	8.7	10.0	12.0	13.0		
4100	110	-15.0		-13.0	-11.5	-9.5	-6.6	-0.5	3.7	8.2	9.2	10.0	11.4	11.5		
4200	109	-13.0		-12.0	-10.5	-9.5	-6.2	-0.1	3.8	6.2	7.5	8.0	10.1	10.3		
4300	109	-11.9		-11.0	-11.3	-7.5	-0.8	0.5	5.6	7.5	8.1	9.0	11.0	12.0		
4400	109	-12.3		-9.0	-7.8	-6.8	-3.5	1.2	6.5	8.0	12.0	15.0	17.4	17.5		
4500	109	-11.9		-11.0	-10.3	-7.6	-3.6	2.8	8.1	11.8	14.0	16.0	17.9	18.0		
4600	108	-14.4		-10.0	-9.8	-8.5	-3.0	3.4	10.1	12.7	14.0	16.0	23.6	23.7		
4700	107	-13.1		-10.0	-9.3	-7.6	-1.3	6.5	9.8	14.2	15.6	19.0	26.6	26.7		
4800	101	-13.3		-13.0	-12.4	-9.0	-0.7	6.3	12.0	16.0	18.7	21.0	28.9	29.0		
4900	100	-19.3		-13.0	-13.7	-5.7	-0.3	7.1	13.0	18.0	19.0	21.0	29.7	29.4		
5000	92	-22.0		-9.0	-9.0	-7.5	0.2	7.0	15.6	18.4	20.0	20.1	24.7	24.9		
5100	89	-12.3		-9.7	-8.6	-6.6	-0.6	7.4	13.7	19.2	20.0	20.7	21.1	21.2		
5200	80	-11.7		-11.0	-8.5	-6.8	-0.8	6.7	12.4	17.5	19.0	21.1	21.6	21.6		
5300	75	-16.5		-10.3	-7.2	-2.6	-0.6	5.0	14.1	18.3	21.1	21.6	21.0	22.0		
5400	73	-22.2		-12.3	-8.3	-3.3	-0.3	3.0	12.7	17.4	21.0	21.6	22.0	22.0		
5500	70	-25.6		-12.7	-9.7	-3.4	-0.6	2.6	12.6	19.6	21.7	22.3	22.0	23.0		
5600	66	-24.4		-12.5	-9.3	-4.0	-0.9	3.6	11.5	20.7	23.0	23.6	33.0	33.1		
5700	62	-23.2		-13.6	-8.0	-5.2	-0.9	2.3	13.2	20.0	25.6	28.6	29.3	29.4		
5800	52	-22.0		-20.0	-12.4	-5.7	-0.9	2.0	14.2	17.4	19.0	24.6	25.2	25.2		
5900	40	-24.0		-20.0	-12.0	-7.7	-1.0	0.3	14.0	15.0	15.0	18.0	19.0	19.0		
6000	31	-17.6		-14.8	-11.1	-7.7	-0.5	12.1	23.5	37.3	37.7	38.0	38.0	38.0		
6100	23	-15.3		-14.8	-10.4	-7.7	-1.0	-0.2	7.4	14.4	18.0	15.2	15.3	15.4		
6200	14	-17.5		-13.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6300	6	-34.0		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6400	2	-14.1		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6500	2	-10.8		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6600	1	-14.9		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6700	1	-22.4		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		
6800	1	-24.2		-14.0	-10.0	-7.7	-1.0	-1.0	14.1	14.8	15.0	15.1	15.1	15.1		

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.7

DATA SOURCE										JULY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 744	-6.0		-5.9	-3.3	-2.3	-1.4	-0.6	+0.5	+2.3	+3.7	+4.9	+5.8	+7.4	+8.0		
1.0 744	-8.0		-5.6	-4.0	-2.3	-0.6	+0.7	+4.5	+7.0	+9.0	+10.2	+12.4	+23.0			
2.0 744	-11.0		-8.9	-5.9	-4.7	-3.3	-1.0	+0.7	+3.9	+6.5	+8.2	+11.1	+16.9	+21.0		
3.0 744	-9.0		-5.5	-4.5	-3.6	-1.7	+0.6	+3.7	+6.3	+8.1	+10.2	+12.9	+19.0			
4.0 744	-9.0		-6.9	-5.8	-4.2	-2.0	+0.4	+3.8	+6.3	+7.9	+10.1	+13.9	+18.0			
5.0 744	-10.0		-9.9	-8.1	-6.2	-5.0	-2.6	+0.0	+3.6	+6.2	+7.7	+9.5	+12.9	+14.0		
6.0 744	-13.0		-10.9	-8.8	-7.7	-6.1	-3.1	+0.2	+3.5	+6.5	+8.3	+10.5	+13.9	+16.0		
7.0 744	-16.0		-12.9	-9.8	-8.1	-6.7	-3.8	+0.4	+3.2	+6.2	+8.7	+10.4	+13.9	+15.0		
8.0 744	-19.0		-15.9	-11.1	-9.2	-7.6	-4.8	+0.6	+3.1	+6.3	+9.0	+11.5	+13.9	+16.0		
9.0 744	-23.0		-15.9	-13.6	-11.2	-9.5	-5.8	+0.8	+3.0	+7.5	+10.0	+12.5	+17.9	+19.0		
10.0 744	-25.0		-21.9	-15.5	-12.4	-10.6	-7.1	+1.6	+3.0	+8.1	+11.8	+14.5	+19.9	+24.0		
11.0 744	-25.0		-23.9	-16.8	-14.6	-12.3	-8.5	+2.6	+3.2	+9.2	+12.4	+16.5	+23.9	+26.0		
12.0 744	-29.0		-25.9	-21.2	-17.2	-14.5	-10.0	+3.5	+2.6	+8.5	+13.2	+16.8	+22.9	+24.0		
13.0 744	-30.0		-24.9	-22.7	-20.1	-16.6	-11.5	+5.0	+1.9	+8.2	+11.7	+18.1	+24.9	+26.0		
14.0 744	-27.0		-26.9	-21.7	-18.8	-15.8	-11.9	+5.2	+0.8	+6.4	+11.0	+13.5	+22.9	+24.0		
15.0 744	-24.0		-23.9	-17.8	-15.7	-13.7	-9.5	+4.3	+0.3	+4.5	+6.8	+9.2	+15.9	+19.0		
16.0 744	-17.0		-14.9	-13.2	-11.3	-9.4	-7.1	+3.0	+0.5	+3.0	+4.5	+5.9	+7.6	+8.0		
17.0 744	-13.0		-12.9	-9.9	-8.7	-7.7	-5.5	+2.1	+0.2	+2.5	+3.7	+4.9	+7.9	+10.0		
18.0 744	-11.0		-10.9	-7.9	-6.7	-5.9	-4.1	+1.2	+0.6	+2.7	+4.0	+4.9	+6.4	+7.0		
19.0 744	-11.0		-9.9	-7.3	-6.4	-5.4	-3.8	+0.8	+0.8	+2.5	+3.5	+4.3	+5.4	+6.0		
20.0 744	-14.0		-8.9	-6.7	-5.6	-4.8	-3.0	+0.8	+0.4	+1.9	+2.8	+3.9	+5.7	+6.0		
21.0 744	-8.0		-7.3	-6.2	-4.9	-3.1	-0.7	+1.4	+3.0	+4.0	+5.5	+7.9	+12.0			
22.0 744	-22.0		-9.9	-6.9	-5.9	-5.2	-3.4	+0.6	+1.9	+3.8	+5.2	+5.7	+8.9	+11.0		
23.0 744	-16.0		-15.9	-7.1	-6.4	-5.3	-3.3	+0.5	+1.8	+3.7	+4.8	+5.8	+8.9	+10.0		
24.0 744	-17.0		-10.9	-7.8	-6.3	-4.6	-2.9	+0.6	+1.3	+3.4	+4.7	+5.8	+7.9	+9.0		
25.0 744	-10.0		-8.9	-7.1	-6.1	-5.0	-3.3	+0.7	+1.1	+2.9	+3.8	+5.1	+6.4	+10.0		
26.0 744	-16.0		-11.9	-7.5	-6.1	-4.9	-3.6	+0.7	+1.2	+3.4	+4.5	+5.3	+6.4	+7.0		
27.0 744	-19.0		-13.9	-8.5	-7.1	-5.9	-3.9	+0.8	+1.3	+3.5	+4.6	+5.6	+6.9	+8.0		
28.0 105	-11.0		-9.0	-8.4	-6.7	-5.0	-1.6	+1.6	+3.4	+3.0	+4.0	+4.8	+4.8			
29.0 108	-7.9		-7.0	-6.5	-5.5	-3.7	-1.0	+2.6	+4.0	+5.4	+6.0	+7.8	+7.8			
30.0 111	-8.0		-7.0	-6.7	-6.1	-3.7	0.0	+3.4	+5.2	+6.7	+7.5	+8.0	+8.1			
31.0 112	-7.6		-7.5	-6.7	-5.2	-3.6	-0.3	+4.0	+6.1	+7.5	+8.0	+9.4	+10.0			
32.0 113	-7.0		-6.4	-4.4	-3.0	0.0	0.0	+3.0	+7.1	+8.2	+8.4	+9.2	+9.4			
33.0 117	-10.6		-8.4	-7.3	-5.7	-2.6	0.3	+4.5	+6.6	+8.4	+9.4	+13.2	+13.5			
34.0 121	-11.9		-8.0	-8.4	-6.6	-3.3	0.4	+4.3	+7.5	+8.1	+8.0	+9.4	+9.5			
35.0 122	-9.8		-8.0	-8.1	-6.4	-3.0	0.6	+3.0	+8.0	+9.4	+10.4	+12.1	+12.4			
36.0 122	-11.0		-9.4	-7.6	-6.5	-3.9	0.4	+4.5	+6.6	+11.2	+13.5	+14.2	+14.4			
37.0 122	-13.2		-11.4	-10.2	-7.6	-4.4	0.1	+4.2	+8.2	+9.2	+11.4	+12.4	+13.0			
38.0 124	-14.0		13.4	-11.6	-7.9	-4.0	0.3	+5.3	+7.7	+9.1	+9.0	+10.7	+10.9			
39.0 125	-11.7		11.5	-10.5	-8.7	-4.8	0.0	+6.0	+9.7	+11.0	+11.0	+13.4	+14.0			
40.0 125	-13.2		11.0	-11.1	-7.7	-5.0	-0.4	+5.7	+7.9	+9.4	+10.4	+14.7	+14.4			
41.0 125	-17.0		-13.7	-12.2	-9.0	-6.4	-0.2	+5.0	+7.6	+8.0	+8.0	+14.4	+14.0			
42.0 124	-10.9		-10.4	-10.1	-8.4	-6.0	-0.4	+3.0	+7.4	+8.0	+8.4	+15.4	+16.0			
43.0 124	-13.0		-11.4	-10.4	-9.0	-6.4	-0.4	+4.7	+8.4	+9.7	+13.4	+16.0	+16.2			
44.0 122	-14.9		-14.4	-13.2	-10.9	-8.4	-0.5	+7.4	+10.2	+12.4	+12.4	+17.4	+17.7			
45.0 121	-17.1		-15.4	-14.2	-10.9	-8.1	+1.4	+8.4	+14.4	+16.4	+16.4	+17.4	+18.0			
46.0 119	-14.8		-14.4	-13.3	-9.1	-3.4	+4.5	+9.7	+16.0	+18.4	+19.4	+20.4	+21.0			
47.0 118	-14.0		-12.0	-12.2	-9.1	-2.5	+5.0	+10.5	+16.0	+16.2	+16.0	+20.4	+20.9			
48.0 117	-13.8		-13.7	-11.7	-9.6	-3.1	+5.2	+11.7	+18.1	+20.4	+21.4	+21.0	+22.0			
49.0 115	-16.0		-14.0	-14.2	-9.6	-1.0	+6.3	+12.4	+19.3	+22.4	+25.3	+25.6	+25.7			
50.0 113	-15.1		-12.0	-11.4	-8.4	-0.4	+5.9	+14.0	+20.7	+23.4	+24.0	+25.4	+26.0			
51.0 110	-16.2		-13.0	-13.2	-5.7	-0.1	+6.0	+12.4	+20.6	+22.6	+24.0	+24.4	+26.6			
52.0 108	-20.9		-15.0	-14.4	-9.6	-1.0	+6.0	+14.4	+17.0	+19.0	+21.0	+30.5	+30.5			
53.0 103	-20.2		-17.0	-14.4	-10.4	-2.6	+6.1	+14.2	+20.4	+24.7	+26.0	+35.0	+35.1			
54.0 97	-23.9		-15.4	-12.6	-3.5	+4.4	+14.4	+21.2	+23.0	+23.0	+41.0	+41.5	+41.6			
55.0 89	-23.0		-14.0	-13.6	-4.0	+5.5	+15.4	+25.6	+27.5	+40.2	+41.3	+41.4				
56.0 84	-27.0		-26.1	-17.0	-6.3	+5.3	+17.2	+21.4	+24.4	+34.2	+34.2	+39.4	+39.4			
57.0 77	-36.0		-19.2	-16.1	-5.0	+5.4	+14.6	+21.1	+26.2	+36.3	+37.2	+37.3				
58.0 66	-23.0		-21.5	-14.7	-5.5	+2.5	+13.5	+14.7	+21.6	+23.4	+24.0	+24.1				
59.0 56	-34.6		-29.7	-21.2	-3.4	+3.5	+11.0	+14.2	+19.7	+25.3	+25.4	+25.7				
60.0 41	-42.5			-13.9	-2.9	+3.5	+13.5	+20.0	+21.1	+23.7	+24.1	+24.2				
61.0 25	-43.6			-15.7	-9.0	+5.4	+14.0	+14.4	+32.4	+32.7	+32.0	+32.0				
62.0 14	-33.1				-15.1	+2.0	+14.1	+34.1	+34.6	+34.4	+34.0	+34.0				
63.0 11	-24.1				-16.3	+12.5	+26.3	+31.6	+32.0	+32.0	+32.0	+32.4	+32.4			
64.0 9	-19.6				-16.4	+7.3	+22.6	+25.4	+26.2	+26.3	+26.5	+26.5				
65.0 9	-14.5					-11.4	+7.4	+15.4	+22.4	+22.6	+22.7	+22.4	+22.4			
66.0 5	-3.6						+3.5	+10.2	+19.4	+19.7	+19.4	+19.4	+19.4			
67.0 4	-35.6						+10.0	+23.3	+23.6	+23.7	+23.7	+23.4	+23.4			
68.0 5	-24.4						+2.5	+10.2	+19.4	+19.0	+20.0	+20.0	+20.0			
69.0 5	-14.0						+3.5	+17.3	+18.0	+18.2	+18.3	+18.3	+18.3			
70.0 5	-14.0						+1.5	+14.2	+15.7	+16.0	+16.0	+17.0	+17.0			

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.8

DATA SOURCE											AUGUST					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-6.0		-5.9	-4.2	-3.5	-2.6	-1.2	-0.2	+1.5	+2.9	+3.7	+5.3	+7.9	+12.0	
1.0	744	-10.0		-7.1	-5.2	-3.6	-1.2	+0.8	+3.8	+5.9	+7.6	+8.9	+11.9	+26.0		
2.0	744	-9.0		-8.9	-7.4	-5.8	-1.3	+1.8	+0.3	+3.5	+5.7	+6.8	+8.2	+12.9	+23.0	
3.0	744	-11.0		-9.9	-6.6	-5.6	-4.4	-2.0	+0.2	+3.4	+5.8	+7.3	+8.9	+15.9	+19.0	
4.0	744	-8.0		-7.1	-6.0	-4.3	-2.1	+0.1	+3.7	+6.5	+8.6	+10.3	+12.9	+16.0		
5.0	744	-11.0		-8.2	-6.4	-4.7	-2.6	+0.0	+4.0	+6.7	+9.3	+11.2	+14.4	+15.0		
6.0	744	-15.0		-13.9	-9.1	-7.0	-5.6	-2.9	+0.2	+3.4	+6.9	+9.5	+11.7	+15.9	+17.0	
7.0	744	-18.0		-14.9	-9.9	-8.4	-6.3	-3.8	+0.3	+3.7	+6.7	+8.9	+12.3	+16.9	+25.0	
8.0	744	-18.0		-16.9	-10.7	-9.7	-7.9	-4.8	+0.5	+3.4	+6.7	+9.0	+12.2	+16.9	+26.0	
9.0	744	-22.0		-19.9	-13.2	-10.9	-9.2	-5.9	+0.7	+3.3	+7.1	+10.4	+13.7	+22.9	+26.0	
10.0	744	-28.0		-25.9	-14.9	-13.8	-11.7	-7.3	+1.2	+3.9	+8.2	+11.8	+14.8	+26.9	+44.0	
11.0	744	-34.0		-26.9	-19.5	-17.0	-13.4	-8.2	+1.4	+4.4	+9.5	+13.0	+17.5	+32.9	+42.0	
12.0	744	-38.0		-33.9	-26.2	-18.3	-15.3	-9.6	+2.4	+4.6	+10.9	+16.0	+18.9	+33.9	+41.0	
13.0	744	-35.0		-34.9	-24.8	-19.0	-16.5	-11.0	+3.6	+3.8	+10.1	+14.7	+18.8	+28.9	+36.0	
14.0	744	-28.0		-27.9	-22.1	-18.9	-14.3	-9.9	+3.2	+2.2	+7.3	+12.2	+17.7	+19.9	+23.0	
15.0	744	-19.0		-16.9	-13.3	-11.6	-10.4	-7.4	+2.5	+1.5	+4.4	+8.0	+10.5	+14.9	+16.0	
16.0	744	-12.0		-10.4	-9.4	-7.9	-5.3	-5.3	+1.5	+1.1	+3.8	+5.4	+7.1	+8.9	+12.0	
17.0	744	-10.0		-8.1	-7.3	-6.1	-3.9	-3.9	+1.0	+1.2	+3.3	+4.5	+5.7	+7.6	+8.0	
18.0	744	-9.0		-8.9	-6.9	-6.1	-5.0	-3.5	+0.8	+1.2	+2.9	+4.4	+5.5	+8.9	+13.0	
19.0	744	-8.0		-7.1	-6.0	-4.8	-2.9	-2.9	+0.8	+0.9	+2.9	+3.9	+4.7	+6.4	+7.0	
20.0	744	-9.0		-7.9	-6.5	-5.7	-4.6	-2.7	+0.6	+0.9	+2.1	+3.3	+4.0	+4.9	+7.0	
21.0	744	-8.0		-7.9	-6.7	-5.7	-4.5	-2.7	+0.5	+1.0	+2.7	+3.7	+4.6	+5.7	+6.0	
22.0	744	-8.0		-7.9	-6.9	-6.0	-4.8	-2.9	+0.5	+1.6	+3.2	+4.2	+4.9	+5.8	+6.0	
23.0	744	-12.0		-11.9	-6.7	-5.8	-4.6	-3.0	+0.4	+1.7	+3.6	+5.0	+6.0	+6.9	+8.0	
24.0	744	-12.0			-6.6	-5.6	-4.6	-3.0	+0.5	+1.6	+3.3	+4.5	+6.0	+7.9	+9.0	
25.0	744	-11.0		-8.9	-6.5	-5.6	-4.6	-3.0	+0.6	+1.3	+3.1	+4.2	+5.3	+6.9	+8.0	
26.0	744	-13.0		-10.9	-7.6	-6.4	-5.1	-3.5	+0.7	+0.8	+2.8	+3.7	+4.5	+6.9	+8.0	
27.0	744	-11.0		-9.9	-7.8	-6.8	-5.8	-3.9	+0.9	+0.6	+2.8	+3.8	+5.1	+6.7	+7.0	
28.0	110	-7.0		-6.0	-6.2	-5.4	-4.4	-3.4	+0.4	2.1	3.0	5.0	5.0	6.4	7.4	
29.0	113	-15.2		-11.0	-10.4	-6.6	-4.2	-0.6	3.0	5.4	5.0	7.0	11.2	11.5		
30.0	113	-17.0		-7.0	-6.0	-6.1	-3.2	-0.1	4.5	4.0	5.0	6.0	6.0	7.0		
31.0	115	-15.9		-8.4	-7.7	-6.1	-3.0	0.6	4.6	6.5	7.0	7.0	10.4	11.0		
32.0	115	-8.3		-7.0	-7.5	-5.9	-3.5	1.0	5.0	7.4	8.0	10.0	21.4	22.0		
33.0	115	-9.0		-8.4	-7.4	-5.1	-2.6	0.6	4.0	7.1	7.4	10.4	15.7	16.4		
34.0	117	-0.1		-8.0	-8.4	-5.4	-3.3	0.6	4.6	8.2	10.4	15.4	25.1	25.1		
35.0	118	-13.0		-11.4	-10.3	-8.1	-5.2	0.0	5.1	4.5	9.2	12.6	13.1	13.2		
36.0	118	-21.0		-9.0	-9.2	-6.7	-4.1	0.4	5.3	4.7	9.0	10.4	10.0	11.0		
37.0	120	-14.4		-12.4	-12.4	-9.7	-5.2	1.3	6.2	4.4	9.1	9.4	9.4	10.0		
38.0	120	-0.2			-8.4	-8.4	-4.6	1.4	4.0	4.0	9.4	10.4	14.4	15.0		
39.0	120	-18.1		-11.4	-9.4	-6.5	-3.0	0.6	5.6	4.2	8.0	9.4	12.4	13.0		
40.0	119	-16.0		-11.0	-11.4	-10.0	-5.3	-0.7	5.1	4.0	10.4	11.4	12.4	13.0		
41.0	117	-16.0		-13.4	-12.7	-10.7	-6.1	-1.2	4.0	4.4	9.7	11.4	12.4	12.4		
42.0	117	-14.0		-12.4	-11.4	-10.1	-6.4	-0.1	4.0	4.2	11.2	11.0	12.4	12.4		
43.0	117	-14.0		-13.4	-11.3	-9.1	-6.2	-0.1	5.4	11.1	12.7	13.4	14.7	14.4		
44.0	115	-15.0		-14.4	-13.4	-10.4	-6.0	1.1	7.6	12.1	16.4	18.0	23.5	23.6		
45.0	114	-14.1		-13.0	-13.2	-9.3	-4.2	2.1	8.4	11.4	14.7	17.0	27.5	27.6		
46.0	113	-14.1		-12.0	-12.2	-10.1	-4.0	4.1	11.0	14.7	14.2	14.0	21.2	21.4		
47.0	110	-15.7		-14.0	-13.5	-10.5	-3.7	4.2	11.2	15.5	17.4	22.0	24.4	24.4		
48.0	110	-16.0		-15.0	-11.5	-7.7	-2.0	5.0	12.2	15.4	10.4	20.0	24.0	24.0		
49.0	104	-27.5		-20.0	-18.5	-14.6	-4.4	4.2	12.0	17.4	10.4	20.0	24.0	24.4		
50.0	105	-21.7		-20.0	-16.4	-13.6	-4.3	3.2	13.1	18.0	20.4	25.0	24.0	24.0		
51.0	105	-27.2		-22.0	-18.4	-11.7	-2.3	4.0	11.0	21.1	24.0	25.0	32.0	32.0		
52.0	94	-31.1		-17.4	-14.1	-10.1	-3.4	4.0	13.0	21.1	24.0	35.0	34.4	35.7		
53.0	94	-27.4		-17.4	-12.2	-8.0	-4.0	4.0	13.7	22.4	25.0	50.0	50.7	50.9		
54.0	91	-26.2		-15.0	-11.2	-7.2	-2.2	4.2	13.4	10.4	21.0	57.1	57.4	57.7		
55.0	83	-23.9		-20.1	-11.4	-5.0	-3.5	11.0	10.0	22.1	22.1	56.2	57.1	57.3		
56.0	75	-19.1		-17.3	-16.1	-7.1	-4.5	11.1	23.3	27.3	27.3	37.2	37.6	37.6		
57.0	61	-29.4		-24.6	-16.9	-6.3	-5.3	15.3	26.0	27.4	27.4	30.4	30.9	31.0		
58.0	44	-27.4		-24.6	-16.9	-6.3	-5.3	15.3	26.0	27.4	27.4	30.4	30.9	31.0		
59.0	37	-16.3		-13.4	-12.0	-9.4	-6.2	4.0	19.4	29.4	30.7	31.1	31.4	31.6		
60.0	27	-29.9		-24.6	-16.9	-6.3	-5.3	15.3	26.0	27.4	27.4	30.4	30.9	31.0		
61.0	27	-18.6		-14.1	-13.4	-11.4	-8.7	-11.1	29.7	34.7	34.7	34.7	34.7	34.7		
62.0	19	-8.1		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
63.0	16	-10.3		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
64.0	10	-13.0		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
65.0	8	-12.0		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
66.0	7	-7.0		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
67.0	6	-11.0		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
68.0	5	-15.0		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
69.0	4	-2.4		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		
70.0	4	-5.7		-10.4	-10.4	-10.4	-10.4	-10.4	29.7	34.7	34.7	34.7	34.7	34.7		

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 11.9

DATA SOURCE											SEPTEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	-15.0			-8.9	-7.2		-5.0	-2.7	-0.5	+0.9	+2.9	+4.4	+6.6	+10.0	+11.0	
1.0	720	-24.0			-14.9	-10.1		-8.0	-3.7	-0.3	+3.5	+7.7	+10.8	+14.9	+25.0	+26.0	
2.0	720	-27.0			-12.9	-8.9		-7.0	-3.6	-0.3	+3.7	+7.3	+10.1	+16.8	+24.0	+25.0	
3.0	720	-25.0			-11.7	-8.7	-6.0	-3.5	-0.2	+3.6	+7.2	+10.2	+13.9	+24.0	+27.0		
4.0	720	-21.0			-10.7	-8.6	-6.3	-3.3	-0.3	+4.0	+7.5	+10.8	+12.6	+25.0	+26.0		
5.0	720	-21.0			-10.8	-9.3	-7.0	-3.8	-0.4	+3.8	+8.3	+11.5	+13.5	+22.0	+23.0		
6.0	720	-20.0			-13.7	-9.8	-7.8	-4.5	-0.5	+4.1	+8.7	+11.7	+14.9	+22.0	+23.0		
7.0	720	-21.0			-14.9	-12.5	-8.8	-4.6	-0.4	+4.6	+9.6	+12.2	+14.2	+24.0	+25.0		
8.0	720	-25.0			-16.2	-12.9	-9.8	-5.1	-0.5	+5.1	+10.6	+13.5	+15.2	+23.0	+24.0		
9.0	720	-28.0			-16.7	-13.4	-10.6	-6.2	-0.6	+5.9	+12.4	+14.8	+16.4	+22.0	+23.0		
10.0	720	-31.0			-19.5	-15.4	-13.1	-8.0	-0.7	+6.5	+12.7	+16.4	+18.6	+26.0	+27.0		
11.0	720	-33.0			-23.7	-18.8	-15.1	-9.3	-0.7	+7.3	+14.1	+18.0	+20.2	+24.0	+25.0		
12.0	720	-35.0			-23.3	-23.2	-17.3	-10.8	-0.8	+7.5	+13.6	+17.5	+20.2	+24.0	+25.0		
13.0	720	-39.0			-30.3	-23.9	-20.7	-11.5	-1.2	+7.1	+14.1	+17.0	+19.8	+23.0	+24.0		
14.0	720	-38.0			-27.6	-24.8	-19.1	-11.5	-2.1	+6.2	+12.0	+14.3	+18.2	+26.0	+27.0		
15.0	720	-27.0			-20.9	-18.5	-15.1	-9.2	-1.8	+3.4	+8.8	+11.5	+13.4	+28.0	+29.0		
16.0	720	-18.0			-15.4	-13.7	-11.5	-6.9	-1.7	+1.9	+5.7	+7.5	+9.9	+21.0	+22.0		
17.0	720	-16.0			-10.1	-9.2	-7.5	-4.7	-0.9	+1.5	+4.0	+5.5	+6.7	+12.0	+13.0		
18.0	720	-12.0			-8.4	-6.9	-5.7	-3.8	-0.9	+1.3	+3.5	+4.6	+5.6	+10.0	+11.0		
19.0	720	-8.0			-6.7	-5.8	-4.8	-3.2	-0.7	+1.0	+2.7	+3.8	+4.7	+11.0	+12.0		
20.0	720	-7.0			-6.1	-5.4	-4.5	-2.7	-0.7	+0.8	+2.5	+3.8	+4.9	+6.0	+7.0		
21.0	720	-9.0			-5.6	-4.9	-4.3	-2.7	-0.6	+1.3	+2.9	+4.1	+5.2	+10.0	+11.0		
22.0	720	-10.0			-6.3	-5.2	-4.4	-2.6	-0.6	+1.2	+2.8	+4.0	+5.3	+8.0	+9.0		
23.0	720	-14.0			-6.1	-5.3	-4.4	-2.6	-0.5	+1.0	+2.5	+3.5	+4.5	+8.0	+9.0		
24.0	720	-13.0			-7.2	-5.7	-4.8	-2.9	-0.7	+1.1	+2.7	+3.6	+4.3	+7.0	+8.0		
25.0	720	-14.0			-7.9	-6.4	-5.1	-3.3	-0.8	+0.9	+2.9	+3.9	+4.8	+7.0	+8.0		
26.0	720	-9.0			-7.3	-6.6	-5.4	-3.5	-0.9	+0.6	+2.4	+3.5	+4.8	+8.0	+9.0		
27.0	720	-18.0			-7.9	-7.1	-6.0	-3.8	-0.9	+0.7	+2.7	+3.7	+4.6	+9.0	+10.0		
28.0	104	-10.0			-8.0	-7.3	-5.8	-3.0	-0.7	2.3	5.4	7.4	8.0	15.7	15.8		
29.0	107	-11.6			-6.0	-5.0	-5.4	-3.0	-0.5	2.8	4.7	6.8	7.0	15.2	15.5		
30.0	104	-8.7			-8.6	-6.8	-5.3	-3.4	-0.8	3.5	7.3	9.0	10.0	15.5	15.5		
31.0	104	-5.4					-4.8	-3.0	0.4	4.2	6.0	8.0	10.0	15.8	15.9		
32.0	104	-13.9			-8.0	-6.4	-5.5	-3.0	1.0	4.0	7.4	12.6	13.9	15.4	15.9		
33.0	104	-4.9			-8.0	-5.8	-4.0	-3.4	1.2	5.1	9.5	11.6	12.9	13.7	13.9		
34.0	104	-10.0			-8.0	-7.3	-6.4	-3.6	0.9	4.7	6.5	7.0	8.0	12.9	13.0		
35.0	104	-12.1			-11.0	-8.5	-7.2	-4.1	0.3	5.5	7.2	8.6	10.4	10.9	11.0		
36.0	104	-10.9			-9.0	-8.5	-7.5	-4.4	-0.1	4.5	9.3	11.6	14.0	14.7	14.8		
37.0	107	-12.0			-10.0	-8.4	-6.0	-4.5	0.1	4.0	9.3	11.6	13.0	20.4	21.0		
38.0	104	-13.0			-9.0	-8.5	-7.3	-4.7	-0.3	4.6	7.4	9.4	17.0	21.4	21.4		
39.0	104	-12.0			-12.0	-11.5	-9.7	-6.1	0.1	5.0	7.4	13.6	15.0	15.5	16.6		
40.0	106	-16.6			-13.0	-10.6	-8.8	-5.4	0.0	5.0	9.4	11.4	12.0	14.7	14.9		
41.0	102	-15.0				-14.7	-10.0	-5.3	0.6	7.1	10.0	12.4	13.0	15.6	15.7		
42.0	102	-15.0					-13.0	-8.0	-0.2	6.4	11.6	13.7	15.0	14.5	14.5		
43.0	100	-16.5			-16.0	-14.7	-12.0	-8.6	0.7	8.2	11.7	15.4	16.0	22.7	22.9		
44.0	94	-24.5				-13.0	-13.0	-8.6	2.1	9.1	11.4	12.0	29.0	25.2	25.4		
45.0	94	-14.7				-13.4	-12.1	-5.4	2.2	9.4	12.3	14.8	21.0	21.5	21.5		
46.0	94	-15.0				-10.0	-9.6	-5.3	2.8	8.5	16.3	18.0	34.1	35.1	35.3		
47.0	86	-9.4				-7.7	-2.8	3.3	3.3	10.3	13.3	22.0	29.0	25.2	25.4		
48.0	85	-13.8				-6.5	-5.8	-3.4	3.6	9.2	13.4	21.0	21.7	22.1	22.2		
49.0	81	-14.0				-9.1	-6.8	-2.7	4.0	10.5	13.4	17.4	19.2	20.3	20.4		
50.0	81	-13.1				-11.2	-6.0	-2.7	5.1	11.7	16.0	19.2	20.2	20.9	21.0		
51.0	76	-12.0				-11.3	-6.1	-2.0	5.2	11.0	16.2	20.3	27.2	27.6	27.6		
52.0	56	-16.4				-8.7	-4.0	-1.5	6.8	12.1	14.2	17.7	25.6	26.3	26.4		
53.0	61	-10.0				-9.4	-7.0	-0.2	6.0	13.1	17.0	19.4	22.4	23.1	23.2		
54.0	54	-13.0				-9.7	-7.1	0.1	7.0	14.3	22.1	24.7	25.4	26.4	26.5		
55.0	55	-15.0				-11.7	-5.2	-1.3	6.8	14.1	22.3	27.7	30.7	31.3	31.5		
56.0	46	-16.0				-10.0	-6.7	-0.7	4.0	14.4	19.4	20.0	34.4	34.7	34.7		
57.0	37	-4.6				-7.1	-0.1	4.0	13.1	19.1	19.0	20.2	20.2	20.5	20.5		
58.0	31	-11.3				-7.4	-2.0	4.5	15.1	21.5	25.2	25.4	25.4	25.4	25.4		
59.0	20	-4.0					-1.4	4.0	12.0	16.0	18.7	19.0	19.2	19.3	19.3		
60.0	12	-14.0					-5.1	5.0	10.1	15.4	16.0	16.0	14.3	16.4	16.4		
61.0	4	-30.0					-9.7	4.5	9.7	23.4	24.0	24.2	24.3	24.3	24.3		
62.0	6	-43.0					-8.0	9.0	9.7	9.0	9.0	9.0	9.0	10.0	10.0		
63.0	6	-55.0						-14.0	1.0	1.7	1.0	1.0	1.0	2.0	2.0		
64.0	2	-5.1						-5.0	0.7	9.0	10.0	10.0	10.0	10.0	10.0		
65.0	1	-34.3												-34.3	-34.3		
66.0	1	-45.1												-45.1	-45.1		
67.0	1	-34.6												-34.6	-34.6		
68.0	1	-24.4												-24.4	-24.4		
69.0	1	-17.5												-17.4	-17.4		
70.0	1	-0.7												-0.7	-0.7		

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH TABLE 11.10

DATA SOURCE											OCTOBER				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	744	-13.0		-12.9	-9.5	-7.8	-6.1	-4.0	-1.2	+0.4	+2.5	+3.4	+4.8	+7.4	+8.0
1.0	744	-18.0		-15.9	-14.7	-12.0	-9.2	-5.8	-1.6	+2.1	+6.2	+8.5	+9.8	+13.9	+16.0
2.0	744	-19.0		-16.9	-12.8	-10.2	-7.8	-4.8	-0.8	+3.1	+6.4	+8.5	+10.7	+14.9	+16.0
3.0	744	-13.0			-11.2	-9.4	-7.7	-4.5	-0.5	+4.0	+7.9	+10.0	+11.1	+13.9	+16.0
4.0	744	-16.0		-13.9	-11.7	-9.8	-8.0	-4.6	-0.4	+4.5	+8.7	+10.4	+11.8	+14.4	+15.0
5.0	744	-19.0		-18.9	-12.5	-11.2	-9.0	-5.1	-0.5	+4.8	+9.4	+11.6	+13.5	+18.9	+20.0
6.0	744	-21.0			-13.7	-12.2	-10.1	-6.1	-0.3	+5.9	+10.8	+13.2	+15.2	+19.9	+23.0
7.0	744	-25.0		-22.9	-17.7	-14.2	-11.8	-6.9	-0.3	+6.9	+11.8	+15.0	+17.6	+23.9	+25.0
8.0	744	-27.0		-25.9	-20.6	-17.0	-13.2	-7.7	-0.1	+8.0	+13.6	+16.5	+21.5	+27.9	+32.0
9.0	744	-33.0		-32.9	-21.7	-19.4	-15.7	-8.5	-0.1	+9.1	+16.1	+21.0	+27.5	+32.4	+33.0
10.0	744	-31.0			-27.8	-23.5	-19.2	-10.1	+0.2	+11.1	+19.1	+26.0	+33.5	+41.4	+42.0
11.0	744	-44.0		-39.9	-31.7	-28.0	-21.7	-12.3	-0.0	+13.2	+21.9	+27.5	+33.5	+42.9	+45.0
12.0	744	-45.0		-38.9	-34.2	-28.2	-23.9	-13.8	-0.1	+13.0	+22.8	+29.6	+35.2	+40.4	+41.0
13.0	744	-49.0		-40.9	-31.1	-27.0	-22.9	-13.5	-0.2	+11.1	+20.2	+24.6	+30.3	+34.9	+37.0
14.0	744	-37.0		-36.9	-26.5	-24.0	-20.2	-11.1	-0.4	+8.2	+13.9	+19.7	+22.8	+25.9	+28.0
15.0	744	-34.0		-31.9	-22.7	-19.5	-16.1	-8.8	-0.4	+6.4	+10.8	+13.5	+15.7	+20.9	+25.0
16.0	744	-28.0		-22.9	-20.1	-16.2	-12.3	-6.5	-0.5	+4.4	+7.7	+9.5	+12.8	+17.9	+21.0
17.0	744	-16.0		-15.9	-12.8	-9.8	-8.2	-4.8	-0.5	+3.0	+5.9	+8.0	+9.7	+18.9	+21.0
18.0	744	-14.0		-12.9	-8.6	-7.2	-5.9	-3.7	-0.7	+1.7	+4.1	+6.0	+7.5	+16.6	+17.0
19.0	744	-9.0			-7.5	-6.6	-5.2	-3.4	-0.7	+1.4	+3.4	+4.8	+6.2	+9.9	+20.0
20.0	744	-8.0			-7.2	-6.2	-4.8	-3.0	-0.6	+1.4	+3.4	+4.8	+6.2	+8.9	+11.0
21.0	744	+10.0		-8.9	-6.7	-5.8	-4.8	-3.1	-0.6	+1.2	+3.0	+3.8	+5.3	+6.9	+11.0
22.0	744	+12.0		-11.9	-7.7	-6.4	-5.0	-3.3	-0.8	+1.0	+2.8	+4.0	+5.3	+6.4	+7.0
23.0	744	+10.0			-6.8	-6.0	-4.9	-3.4	-0.7	+1.2	+2.8	+3.9	+4.8	+6.9	+9.0
24.0	744	+11.0		-9.9	-6.8	-5.8	-4.8	-3.1	-0.7	+1.2	+3.2	+4.4	+5.5	+6.9	+12.0
25.0	744	+9.0			-7.5	-6.1	-5.2	-3.3	-0.7	+1.3	+3.4	+4.4	+6.2	+7.9	+10.0
26.0	744	+10.0		-9.9	-8.1	-6.9	-6.0	-3.7	-0.8	+1.4	+2.9	+4.0	+4.8	+6.9	+8.0
27.0	744	+12.0		-9.9	-7.6	-6.7	-5.8	-4.0	-0.9	+1.4	+3.5	+4.7	+5.5	+7.9	+9.0
28.0	74	-8.3				-7.2	-5.5	-2.7	0.5	6.4	7.4	13.2	13.2	14.9	18.1
29.0	82	-0.0					-5.9	-4.1	0.5	5.0	6.7	7.1	9.1	9.6	9.7
30.0	84	-8.0				-7.5	-5.4	-3.1	0.0	4.0	7.0	9.1	9.0	9.0	10.0
31.0	85	-11.0				-8.1	-5.7	-3.2	1.8	5.8	7.0	9.1	15.1	15.0	16.0
32.0	90	-11.0				-8.0	-5.5	-2.6	1.3	6.0	9.5	13.0	14.1	14.0	15.0
33.0	90	-11.7				-8.0	-5.2	-3.7	0.8	4.6	11.1	11.6	11.4	12.0	12.0
34.0	90	-0.0				-8.0	-5.5	-4.0	-0.1	4.5	6.5	7.0	8.1	9.0	9.0
35.0	90	-14.2				-12.0	-10.6	-6.7	-1.0	3.8	8.2	9.0	11.1	11.0	12.0
36.0	91	-12.0				-10.6	-8.0	-5.0	-1.7	2.4	5.4	7.0	8.6	9.0	9.0
37.0	90	-11.3				-10.6	-8.2	-7.1	-2.0	2.8	5.3	7.0	10.1	10.0	11.0
38.0	89	-15.0				-13.0	-10.8	-5.0	-1.3	3.7	6.0	9.0	10.1	10.8	10.9
39.0	94	-10.1				-9.0	-7.7	-6.0	-0.1	6.8	9.8	11.0	13.0	13.7	13.4
40.0	95	-10.1				-10.8	-7.6	-4.2	0.0	5.3	9.5	12.0	16.0	16.7	16.4
41.0	94	-10.6				-8.0	-7.3	-4.5	1.0	5.4	11.7	12.0	14.1	15.0	15.2
42.0	97	-21.6				-10.8	-7.1	-4.2	0.8	7.5	10.7	13.0	13.0	14.3	14.4
43.0	97	-22.7				-14.8	-7.1	-3.0	2.0	7.8	11.5	12.8	16.0	19.1	19.3
44.0	94	-21.9				-10.4	-9.1	-4.0	3.4	10.0	15.3	16.0	19.1	19.0	20.0
45.0	92	-21.1				-8.0	-7.5	-3.4	4.0	0.6	17.4	19.0	24.1	24.0	25.0
46.0	93	-16.0				-9.0	-7.3	-4.0	4.3	12.4	18.4	19.0	20.6	21.1	21.1
47.0	91	-19.0				-11.6	-8.5	-3.1	5.8	13.6	18.7	20.0	22.1	23.0	23.1
48.0	89	-14.7				-10.0	-5.0	-2.7	5.1	13.7	18.5	20.0	23.1	24.0	24.1
49.0	86	-21.5				-16.0	-6.9	-3.3	6.1	15.5	19.7	23.0	24.2	25.0	25.1
50.0	84	-17.2				-15.1	-8.3	-3.2	5.5	18.2	22.0	23.0	24.1	25.4	25.6
51.0	79	-11.5				-10.6	-8.5	-1.6	5.6	19.1	25.1	25.0	27.1	27.5	27.6
52.0	74	-10.7				-9.0	-7.2	-1.5	5.4	19.1	25.1	25.0	27.1	27.5	27.6
53.0	70	-9.9				-7.4	-5.7	-1.0	5.3	13.0	21.5	26.4	30.3	30.0	31.0
54.0	63	-8.0				-5.0	-5.6	-2.8	4.0	12.5	18.0	26.4	30.0	30.0	31.0
55.0	57	-8.0				-7.7	-6.6	-3.3	2.5	13.5	22.1	22.0	25.4	26.0	26.1
56.0	44	-0.0					-5.6	-4.2	2.0	10.7	14.6	16.0	21.5	22.0	22.0
57.0	40	-16.0					-10.0	-7.2	2.0	10.3	13.0	23.0	23.3	23.5	23.5
58.0	34	-14.0					-13.3	-8.3	2.7	8.6	22.3	26.0	26.4	26.4	26.4
59.0	27	-17.0					-9.6	-8.2	2.0	9.7	17.7	37.0	37.4	37.4	37.4
60.0	22	-16.2					-14.0	-7.8	0.0	12.5	22.9	39.7	40.1	40.3	40.4
61.0	14	-11.8						-9.9	3.0	19.4	43.3	43.3	43.4	43.9	43.9
62.0	4	-8.0							-1.0	7.5	4.0	8.1	9.2	9.2	9.3
63.0	2	-8.0							-8.0	2.7	2.0	3.0	3.0	3.0	3.0
64.0	1	-3.0													-3.0
65.0	1	4.0													4.0
66.0	1	3.8													3.8
67.0	1	2.2													2.2
68.0	1	0.7													0.7
69.0	1	2.6													2.6
70.0	1	7.3													7.3

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 11.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)	DIR (DEG)
SFC	720	-10.0			-8.6	-7.7	-6.6	-3.8	-1.0	+0.6	+2.5	+3.5	+4.5	+7.0	+8.0	
1.0	720	-19.0			-15.1	-11.6	-9.3	-5.8	-0.9	+2.9	+7.3	+9.2	+11.7	+21.0	+22.0	
2.0	720	-19.0			-13.7	-11.1	-8.5	-4.9	-0.6	+3.1	+7.9	+9.8	+12.8	+19.0	+20.0	
3.0	720	-16.0			-11.9	-10.3	-8.5	-5.7	-0.7	+3.6	+7.5	+10.8	+13.7	+21.0	+22.0	
4.0	720	-20.0			-13.5	-11.5	-9.5	-5.9	-0.8	+4.0	+8.2	+11.7	+15.9	+22.0	+23.0	
5.0	720	-20.0			-16.8	-13.4	-10.7	-6.7	-0.8	+4.3	+9.5	+13.6	+16.9	+27.0	+28.0	
6.0	720	-25.0			-18.5	-15.7	-12.4	-7.7	-0.9	+4.9	+11.5	+16.1	+21.9	+26.0	+27.0	
7.0	720	-26.0			-21.1	-17.9	-14.6	-8.9	-0.9	+5.9	+13.6	+18.8	+24.4	+32.0	+33.0	
8.0	720	-38.0			-24.7	-19.8	-16.7	-10.3	-1.1	+6.7	+15.5	+22.7	+28.4	+44.0	+45.0	
9.0	720	-42.0			-26.8	-23.9	-19.8	-11.2	-0.8	+8.4	+17.6	+24.5	+30.6	+53.0	+54.0	
10.0	720	-48.0			-32.7	-27.5	-23.3	-12.6	-0.8	+10.0	+19.7	+27.2	+33.4	+62.0	+63.0	
11.0	720	-50.0			-36.7	-32.1	-26.1	-14.5	-1.1	+11.1	+22.6	+29.2	+39.4	+68.0	+69.0	
12.0	720	-44.0			-35.3	-31.9	-25.7	-16.1	-1.5	+11.5	+22.0	+29.5	+39.9	+80.0	+81.0	
13.0	720	-43.0			-32.8	-28.2	-23.5	-14.5	-1.8	+10.8	+21.3	+27.5	+34.2	+78.0	+79.0	
14.0	720	-39.0			-29.3	-24.1	-19.3	-12.0	-2.2	+8.6	+16.7	+22.8	+27.9	+63.0	+64.0	
15.0	720	-33.0			-25.5	-20.3	-15.7	-10.4	-0.9	+6.6	+12.9	+16.9	+21.8	+52.0	+53.0	
16.0	720	-27.0			-19.9	-17.3	-13.1	-8.5	-1.3	+5.2	+10.6	+14.7	+19.4	+33.0	+34.0	
17.0	720	-24.0			-17.9	-15.5	-10.9	-6.8	-1.0	+3.9	+8.7	+11.4	+14.4	+33.0	+34.0	
18.0	720	-16.0			-13.9	-11.1	-8.6	-5.4	-0.9	+2.8	+6.5	+9.4	+11.9	+22.0	+23.0	
19.0	720	-12.0			-10.4	-8.7	-6.3	-4.2	-0.8	+2.5	+5.5	+7.4	+9.2	+16.0	+17.0	
20.0	720	-10.0			-7.7	-6.4	-5.3	-3.4	-0.7	+1.8	+4.5	+5.8	+8.2	+18.0	+19.0	
21.0	720	-13.0			-6.9	-5.7	-4.8	-2.8	-0.6	+1.9	+4.2	+5.7	+7.4	+13.0	+14.0	
22.0	720	-8.0			-7.1	-6.4	-5.3	-2.9	-0.5	+2.2	+4.7	+6.0	+7.4	+14.0	+15.0	
23.0	720	-11.0			-6.9	-6.2	-5.0	-2.7	-0.3	+2.7	+4.7	+5.8	+7.2	+9.5	+10.0	
24.0	720	-12.0			-7.5	-6.6	-5.0	-2.7	-0.2	+2.7	+4.8	+6.7	+8.2	+12.0	+13.0	
25.0	720	-16.0			-9.1	-7.5	-5.9	-3.2	-0.2	+3.0	+5.7	+7.2	+8.7	+13.0	+14.0	
26.0	720	-13.0			-8.7	-7.6	-6.0	-3.5	-0.3	+3.1	+5.8	+7.7	+9.3	+12.0	+13.0	
27.0	720	-13.0			-8.9	-8.2	-6.3	-3.2	-0.2	+3.4	+6.5	+7.7	+9.2	+15.0	+16.0	
28.0	89	-7.0			-6.0	-5.0	-4.6	-1.4	3.1	9.0	12.3	13.5	14.1	14.4	14.5	
29.0	90	-9.0			-7.5	-6.5	-5.5	-1.7	3.7	8.0	11.5	14.0	17.1	27.5	27.5	
30.0	90	-9.4			-7.0	-6.4	-5.4	-1.0	3.8	9.1	13.5	15.0	17.1	17.9	18.0	
31.0	91	-11.8			-7.0	-6.4	-5.4	-1.1	3.7	9.6	11.9	13.3	15.7	14.0	14.0	
32.0	91	-13.9			-7.5	-6.5	-5.5	-1.4	3.4	9.9	12.7	13.5	13.4	14.0	14.0	
33.0	92	-17.2			-8.0	-6.9	-5.9	-2.0	4.5	9.0	12.9	15.0	17.1	18.1	18.2	
34.0	92	-11.0			-8.0	-6.9	-5.9	-2.0	4.0	10.1	14.1	15.0	21.1	21.4	21.7	
35.0	92	-12.0			-12.0	-9.5	-8.5	-3.4	1.6	9.3	14.5	14.0	27.1	27.1	27.1	
36.0	90	-14.8			-11.0	-9.2	-8.2	-5.1	4.3	10.2	15.4	14.0	25.1	25.7	25.4	
37.0	91	-16.0			-11.8	-9.2	-8.2	-5.0	4.5	12.5	21.4	24.0	26.0	26.4	27.0	
38.0	94	-22.1			-15.0	-9.3	-8.3	-4.0	5.0	13.8	23.2	24.0	26.0	26.7	26.4	
40.0	93	-23.8			-15.0	-9.3	-8.3	-4.1	5.1	15.4	19.4	23.0	27.1	27.4	27.9	
41.0	93	-21.3			-20.4	-13.3	-12.3	-4.7	7.1	15.7	25.4	26.4	29.1	29.4	29.1	
42.0	93	-22.8			-17.0	-11.3	-10.3	-2.4	7.4	17.7	26.4	24.0	31.1	31.0	32.0	
43.0	92	-17.9			-14.0	-9.4	-8.4	-1.4	9.7	14.7	24.7	32.0	39.1	39.0	40.0	
44.0	84	-9.1			-7.7	-6.4	-5.4	-0.5	12.3	25.0	34.4	39.7	41.1	41.0	42.0	
45.0	86	-8.3			-9.0	-7.5	-6.5	-2.4	8.0	24.5	39.7	45.4	49.1	49.0	50.0	
46.0	86	-8.3			-7.0	-5.7	-4.7	-1.4	13.0	29.2	45.7	53.0	53.4	53.0	54.0	
47.0	83	-6.0			-2.4	-1.4	-0.4	4.5	13.2	30.4	47.0	53.1	51.2	51.0	52.0	
48.0	82	-7.8			-7.1	-6.4	-5.4	-1.4	16.3	33.0	42.9	47.1	48.2	48.0	49.0	
49.0	85	-9.0			-7.1	-6.4	-5.4	-1.4	18.4	33.4	42.9	48.1	55.2	55.0	55.2	
50.0	84	-10.0			-8.1	-7.3	-6.3	-2.2	16.8	31.3	40.4	48.0	44.4	44.0	45.0	
51.0	77	-9.9			-8.2	-7.2	-6.2	-1.1	14.4	25.0	36.4	44.2	48.2	48.0	49.0	
52.0	74	-11.5			-10.0	-9.0	-8.0	-3.0	14.3	24.0	39.5	43.4	47.1	47.0	48.0	
53.0	70	-15.6			-10.0	-9.0	-8.0	-3.0	12.4	31.7	41.5	46.4	50.4	50.0	51.0	
54.0	61	-14.6			-13.4	-12.4	-11.4	-4.0	15.0	29.7	37.2	37.0	43.4	43.0	44.0	
55.0	52	-15.2			-10.0	-9.0	-8.0	-3.4	14.3	26.3	32.7	34.0	35.5	35.0	36.0	
56.0	47	-19.3			-10.0	-9.0	-8.0	-3.4	11.5	22.0	29.4	31.0	34.5	34.0	35.0	
57.0	45	-17.4			-7.1	-6.4	-5.4	-1.4	12.0	25.0	29.1	35.2	35.0	36.4	36.5	
58.0	38	-9.0			-10.6	-9.6	-8.6	-3.4	14.5	32.2	36.4	41.2	41.5	41.7	41.7	
59.0	29	-16.0			-11.0	-10.0	-9.0	-3.4	16.5	31.7	38.0	43.4	43.4	44.0	44.0	
60.0	21	-23.0			-10.6	-9.6	-8.6	-3.4	13.0	29.7	34.2	34.5	34.5	35.0	35.0	
61.0	16	-17.0			-10.6	-9.6	-8.6	-3.4	11.5	26.4	35.2	35.7	35.7	36.0	36.0	
62.0	15	-11.2			-14.3	-13.3	-12.3	-4.0	14.3	29.3	37.4	37.7	37.0	38.0	38.0	
63.0	11	-16.0			-20.9	-19.9	-18.9	-6.0	14.0	34.0	34.7	34.0	32.3	33.0	33.0	
64.0	7	-35.7							14.0	34.0	34.7	34.0	34.0	34.0	34.0	
65.0	6	-9.9							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
66.0	4	-9.5							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
67.0	4	-9.0							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
68.0	4	-10.3							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
69.0	3	-22.7							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
70.0	2	-25.6							14.0	41.4	41.2	42.1	42.1	42.2	42.2	
Positive is wind from the right (180°). Negative is wind from the left (360°).																

Positive is wind from the right (180°).
Negative is wind from the left (360°).

DATA SOURCE											DECEMBER				
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM OBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
SFC	744	-10.0		-9.9	-8.9	-7.7	-6.0	-3.7	-1.1	+0.9	+3.1	+4.6	+6.1	+7.9	+9.0
1.0	744	-21.0		-17.9	-13.1	-11.1	-9.1	-5.2	-0.5	+4.9	+8.9	+10.7	+12.5	+17.9	+22.0
2.0	744	-17.0		-11.7	-9.6	-7.9	-4.4	-0.2	+4.6	+8.8	+11.0	+13.2	+16.9	+18.0	
3.0	744	-27.0		-22.9	-12.7	-11.2	-8.2	-4.5	-0.1	+5.1	+8.9	+11.7	+14.6	+18.9	+21.0
4.0	744	-28.0		-25.9	-16.2	-11.8	-8.9	-4.8	-0.0	+5.9	+10.7	+13.6	+16.7	+22.9	+28.0
5.0	744	-26.0		-23.9	-18.8	-13.6	-10.2	-5.0	+0.2	+7.7	+12.9	+16.0	+21.7	+28.9	+38.0
6.0	744	-31.0		-29.9	-19.5	-15.0	-11.5	-5.4	+0.2	+8.5	+13.5	+17.4	+25.2	+35.9	+46.0
7.0	744	-31.0		-30.9	-19.5	-17.0	-12.2	-6.0	+0.5	+9.8	+15.2	+19.5	+27.7	+37.9	+40.0
8.0	744	-36.0		-30.9	-21.5	-17.5	-12.9	-7.0	+1.2	+10.7	+18.3	+25.0	+30.7	+40.9	+63.0
9.0	744	-35.0		-31.9	-25.5	-21.0	-15.3	-7.5	+1.7	+12.7	+21.7	+28.5	+34.7	+43.9	+57.0
10.0	744	-39.0		-36.9	-27.7	-23.3	-17.7	-9.2	+1.6	+14.7	+23.8	+31.5	+37.5	+47.9	+67.0
11.0	744	-39.0		-37.9	-31.2	-26.0	-19.2	-10.4	+1.0	+16.0	+25.9	+34.5	+40.5	+53.4	+54.0
12.0	744	-52.0		-36.9	-29.7	-26.0	-20.8	-10.9	+1.5	+17.1	+27.9	+37.0	+43.5	+50.9	+57.0
13.0	744	-49.0		-34.9	-26.5	-21.5	-18.3	-8.6	+1.8	+15.9	+26.7	+35.0	+40.7	+49.9	+53.0
14.0	744	-34.0		-30.9	-23.2	-17.2	-12.9	-7.3	+1.3	+13.9	+22.2	+28.6	+31.8	+35.9	+38.0
15.0	744	-37.0		-30.9	-23.2	-17.2	-12.9	-7.3	+1.3	+13.9	+22.2	+28.6	+31.8	+35.9	+38.0
16.0	744	-25.0		-17.2	-13.0	-9.9	-5.4	-1.1	+10.2	+15.6	+20.0	+23.5	+26.4	+27.0	
17.0	744	-25.0		-23.9	-15.9	-13.0	-9.6	-5.4	+0.8	+9.0	+14.0	+17.0	+18.8	+26.9	+28.0
18.0	744	-18.0		-14.9	-13.1	-11.2	-8.1	-4.1	+0.0	+7.1	+11.7	+13.5	+15.7	+18.9	+22.0
19.0	744	-15.0		-12.9	-10.3	-9.0	-6.8	-3.6	+0.0	+4.8	+8.4	+10.5	+13.2	+16.9	+18.0
20.0	744	-18.0		-15.9	-9.2	-6.9	-5.5	-2.9	+0.2	+3.6	+6.4	+8.0	+8.9	+13.9	+18.0
21.0	744	-19.0		-16.9	-8.8	-6.4	-4.9	-2.7	+0.0	+2.9	+6.0	+7.5	+9.5	+16.4	+17.0
22.0	744	-16.0		-10.9	-6.8	-6.0	-4.6	-2.8	+0.4	+2.5	+5.2	+6.8	+8.1	+11.9	+13.0
23.0	744	-13.0		-10.9	-6.9	-5.9	-4.9	-2.8	+0.3	+2.8	+5.3	+6.6	+8.1	+16.9	+19.0
24.0	744	-12.0		-10.9	-7.5	-6.3	-5.1	-2.8	+0.2	+3.2	+5.7	+7.1	+9.1	+11.9	+13.0
25.0	744	-15.0		-14.9	-7.5	-7.3	-5.5	-3.2	+0.1	+3.4	+6.8	+8.6	+9.7	+12.9	+14.0
26.0	744	-16.0		-13.9	-9.6	-8.1	-6.3	-3.4	+0.0	+3.9	+7.6	+9.4	+10.5	+11.9	+14.0
27.0	744	-17.0		-12.9	-10.1	-8.4	-6.7	-2.8	+0.0	+4.8	+8.2	+9.9	+11.9	+16.9	+19.0
28.0	132	-11.0			-8.0	-6.2	-2.2	3.6	7.5	10.0	12.6	15.7	15.7	17.4	17.5
29.0	134	-9.0			-8.7	-5.7	-2.1	4.1	8.9	12.7	15.6	15.6	15.6	20.8	21.0
30.0	139	-4.7			-9.6	-5.4	-3.7	0.3	5.5	10.6	15.1	20.0	21.4	25.4	25.4
31.0	140	-9.0			-9.6	-5.4	-4.2	-0.5	6.9	14.8	17.0	20.8	27.4	30.4	31.0
32.0	141	-12.0			-9.6	-5.0	-4.5	-0.4	6.1	17.2	21.5	22.4	27.4	30.4	31.0
33.0	141	-13.6			-9.6	-5.0	-4.3	-0.4	7.0	17.5	23.0	24.0	26.4	30.1	30.3
34.0	141	-9.0				-7.0	-6.0	-0.1	4.0	16.3	23.0	25.0	29.4	40.4	41.0
35.0	141	-14.2			-13.6	-10.0	-7.0	0.2	4.2	14.6	20.5	25.4	27.4	29.4	29.0
36.0	141	-17.3			-15.6	-13.4	-8.0	0.1	4.6	17.1	21.0	27.0	27.4	26.4	31.1
37.0	141	-14.8			-15.6	-12.8	-10.0	-2.0	7.7	14.0	23.0	25.4	26.4	30.0	40.1
38.0	141	-17.3				-16.0	-14.6	-4.7	8.4	14.5	24.7	31.0	34.8	36.0	37.1
39.0	142	-14.8				-18.4	-14.0	-4.0	8.7	20.2	27.0	33.4	39.4	51.0	51.2
40.0	142	-21.0				-20.0	-15.0	-13.0	4.6	14.0	25.0	30.8	47.4	51.5	51.6
41.0	142	-30.8				-24.4	-17.4	-10.6	4.6	14.0	25.4	31.0	40.4	41.7	41.9
42.0	140	-27.8				-25.6	-12.4	-10.7	-3.3	9.1	14.0	24.0	31.4	32.4	33.4
43.0	139	-21.6				-14.6	-12.4	-9.7	-2.9	10.3	14.0	24.1	31.4	33.4	34.0
44.0	140	-19.0				-13.6	-11.0	-10.0	-2.3	9.2	17.3	22.0	24.4	36.4	41.4
45.0	138	-14.0				-15.6	-12.0	-10.1	-3.1	7.0	16.1	22.1	27.0	37.4	45.7
46.0	137	-24.0				-17.6	-12.0	-10.6	-4.1	7.7	17.3	23.0	26.0	33.4	43.1
47.0	138	-23.0				-17.6	-12.0	-10.1	-3.0	8.3	14.0	24.1	24.0	30.4	37.4
48.0	136	-24.0				-17.8	-15.0	-10.1	-2.1	9.7	14.0	26.4	28.0	35.4	34.4
49.0	130	-17.0				-16.4	-16.0	-11.5	-1.4	10.4	20.1	25.4	29.0	34.4	35.0
50.0	127	-24.0				-22.7	-18.1	-10.6	-1.4	9.4	20.1	25.4	24.4	29.7	31.7
51.0	122	-21.7				-23.4	-24.1	-10.6	-0.0	11.3	20.3	26.0	28.0	30.4	34.2
52.0	115	-24.0				-21.4	-19.4	-13.2	-0.0	10.3	20.5	27.3	30.0	31.0	42.7
53.0	110	-24.0				-21.0	-19.6	-12.5	-1.4	9.4	20.3	27.3	30.4	32.0	43.1
54.0	102	-24.0				-22.0	-19.6	-13.0	-1.0	7.7	14.6	24.0	31.4	35.0	37.0
55.0	92	-30.0				-16.0	-13.7	-6.4	7.2	17.4	30.4	35.0	42.0	45.1	46.4
56.0	81	-33.0				-30.2	-20.0	-4.1	7.8	20.4	30.0	31.4	34.4	44.4	46.7
57.0	67	-35.0				-29.6	-27.4	-8.2	4.5	19.6	31.3	34.4	44.4	44.7	44.4
58.0	51	-25.4				-22.4	-21.4	-11.0	4.4	24.0	32.7	39.0	40.4	40.4	41.0
59.0	39	-27.6				-22.1	-14.4	-10.4	0.6	10.4	34.1	37.1	37.4	37.4	37.0
60.0	22	-24.0					-16.4	-10.0	-10.0	11.6	42.0	44.4	44.4	44.7	44.7
61.0	15	-24.2					-18.6	-6.5	19.6	52.3	52.3	52.3	53.1	53.2	53.2
62.0	4	-14.5					-14.4	-4.0	21.7	54.7	54.0	54.0	54.0	54.0	54.0
63.0	2	-14.4						-14.0	-2.4	-2.2	-2.1	-2.1	-2.1	-2.1	-2.1
64.0	1	-4.4													-4.4

Positive is wind from the right (180°).
Negative is wind from the left (360°).

RIGHT AND LEFT CROSS WIND COMPONENTS 90 DEGREE FLIGHT AZIMUTH

TABLE 11.13

DATA SOURCE										ANNUAL							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5.0	8766	-15.0	-10.9	-8.4	-6.9	-5.5		-2.9	-0.4	+1.8	+3.7	+5.0	+6.2	+8.9	+13.0		
1.0	8766	-24.0	-17.0	-12.1	-9.7	-7.6		-3.9	+0.0	+4.6	+8.5	+11.0	+13.9	+21.0	+24.0		
2.0	8766	-28.0	-17.9	-12.4	-9.4	-7.3		-3.8	+0.1	+4.3	+8.3	+10.9	+13.7	+19.8	+25.0		
3.0	8766	-32.0	-21.0	-13.1	-10.2	-7.7	-4.0	+0.2	+4.5	+9.0	+12.0	+14.9	+21.5	+32.0			
4.0	8766	-33.0	-23.1	-14.7	-10.9	-8.3	-4.4	+0.2	+5.0	+9.8	+13.3	+16.5	+23.7	+38.0			
5.0	8766	-35.0	-24.7	-15.8	-12.4	-9.1	-4.8	+0.2	+5.3	+10.8	+14.4	+18.6	+27.0	+39.0			
6.0	8766	-40.0	-26.0	-17.1	-13.3	-10.2	-5.5	+0.3	+6.0	+11.9	+16.1	+20.8	+31.0	+44.0			
7.0	8766	-36.0	-28.0	-18.9	-15.1	-11.7	-6.0	+0.3	+6.6	+13.5	+18.2	+23.4	+36.3	+40.0			
8.0	8766	-38.0	-30.3	-20.8	-16.8	-12.8	-6.7	+0.3	+7.3	+14.9	+20.3	+26.0	+39.3	+43.0			
9.0	8766	-42.0	-33.3	-23.8	-19.4	-14.8	-8.0	+0.4	+8.4	+16.8	+23.2	+29.1	+42.1	+61.0			
10.0	8766	-48.0	-37.8	-27.3	-22.6	-17.2	-9.4	+0.5	+9.8	+19.1	+25.5	+32.2	+47.3	+67.0			
11.0	8766	-52.0	-40.1	-31.3	-25.7	-19.5	-11.0	+0.6	+10.6	+21.0	+27.2	+34.9	+52.0	+69.0			
12.0	8766	-56.0	-44.7	-32.3	-27.1	-21.0	-12.1	+0.7	+11.1	+21.5	+28.4	+35.2	+50.0	+81.0			
13.0	8766	-49.0	-41.4	-30.9	-25.4	-20.8	-12.2	+0.9	+10.3	+20.0	+25.0	+30.7	+47.0	+79.0			
14.0	8766	-43.0	-37.5	-27.0	-22.7	-18.3	-11.1	+1.1	+8.2	+16.3	+21.3	+25.4	+37.7	+64.0			
15.0	8766	-50.0	-30.0	-22.0	-18.7	-15.0	-9.4	+1.1	+6.7	+13.3	+17.0	+20.9	+31.5	+53.0			
16.0	8766	-36.0	-25.0	-18.3	-15.2	-12.1	-7.5	+0.9	+5.3	+11.2	+14.7	+17.7	+25.4	+40.0			
17.0	8766	-26.0	-21.3	-15.1	-12.6	-9.8	-6.0	+0.8	+4.0	+9.3	+12.4	+15.7	+22.8	+44.0			
18.0	8766	-22.0	-17.0	-12.0	-9.8	-7.9	-4.7	+0.8	+3.0	+7.2	+9.8	+12.5	+17.2	+24.0			
19.0	8766	-18.0	-14.2	-9.7	-7.7	-6.2	-3.9	+0.7	+2.2	+5.4	+7.6	+9.9	+14.0	+21.0			
20.0	8766	-23.0	-12.5	-8.0	-6.8	-5.4	-3.3	+0.6	+1.7	+4.6	+6.3	+8.3	+12.8	+19.0			
21.0	8766	-20.0	-15.2	-8.1	-6.5	-5.2	-3.1	+0.6	+1.7	+3.9	+5.5	+7.2	+12.5	+21.0			
22.0	8766	-33.0	-13.0	-7.7	-6.4	-5.3	-3.2	+0.6	+1.8	+3.9	+5.4	+6.8	+12.2	+21.0			
23.0	8766	-20.0	-13.5	-7.7	-6.4	-5.1	-3.2	+0.5	+1.8	+4.1	+5.5	+7.0	+13.3	+27.0			
24.0	8766	-24.0	-12.1	-7.8	-6.4	-5.1	-3.1	+0.5	+1.9	+4.2	+5.8	+7.5	+12.4	+22.0			
25.0	8766	-16.0	-12.4	-8.5	-6.8	-5.4	-3.3	+0.6	+1.9	+4.4	+6.1	+7.7	+11.2	+19.0			
26.0	8766	-17.0	-13.0	-8.6	-7.0	-5.6	-3.5	+0.6	+2.0	+4.6	+6.5	+8.5	+12.0	+18.0			
27.0	8766	-22.0	-12.7	-8.9	-7.4	-5.8	-3.6	+0.6	+2.2	+5.2	+7.1	+9.3	+13.9	+23.0			
28.0	1190	-11.0	-7.6	-6.5	-5.3	-4.0	-2.9	+0.4	+1.0	+3.0	+4.5	+6.0	+10.0	+17.0			
29.0	1224	-16.0	-15.3	-9.1	-6.0	-5.2	-3.9	+0.4	+1.0	+3.4	+5.0	+6.5	+10.0	+17.0			
30.0	1246	-17.0	-15.3	-9.1	-6.5	-5.3	-3.7	+1.5	+6.5	+10.2	+12.4	+15.4	+21.7	+25.4			
31.0	1262	-15.9	-13.3	-8.5	-6.7	-5.1	-3.6	+1.4	+4.9	+11.4	+14.4	+17.1	+27.3	+31.0			
32.0	1274	-13.9	-8.8	-7.5	-5.4	-3.9	-2.9	+1.0	+7.3	+13.5	+17.4	+21.2	+27.3	+31.0			
33.0	1294	-18.0	-14.6	-10.0	-8.2	-6.1	-3.0	+1.4	+7.0	+13.3	+17.4	+21.0	+26.4	+30.3			
34.0	1316	-14.0	-10.7	-8.8	-7.5	-6.1	-3.1	+1.1	+6.7	+13.0	+17.4	+21.4	+29.2	+41.0			
35.0	1330	-27.9	-13.0	-8.8	-7.5	-6.1	-3.1	+0.4	+7.2	+13.4	+16.7	+20.4	+27.2	+29.0			
36.0	1333	-24.4	-21.2	-14.0	-11.5	-9.3	-5.3	+0.5	+6.9	+13.5	+17.4	+20.3	+27.2	+31.4			
37.0	1334	-23.3	-20.6	-14.0	-11.7	-9.7	-6.6	+0.4	+7.0	+13.9	+18.4	+21.0	+30.2	+40.1			
38.0	1346	-23.9	-16.8	-13.2	-10.2	-8.7	-6.7	+0.7	+7.5	+14.5	+19.0	+24.1	+34.6	+37.1			
39.0	1355	-26.1	-22.2	-17.1	-13.2	-10.3	-8.5	+0.9	+8.4	+15.4	+21.1	+25.4	+39.2	+51.2			
40.0	1357	-24.8	-23.7	-15.6	-13.6	-10.5	-8.6	+1.0	+8.4	+15.4	+22.7	+25.4	+47.2	+51.5			
42.0	1344	-27.8	-25.2	-16.3	-12.0	-9.1	-6.6	+1.1	+8.4	+16.4	+21.4	+26.4	+40.2	+41.9			
43.0	1334	-24.9	-23.2	-14.8	-12.5	-10.1	-8.3	+1.2	+9.5	+17.0	+22.2	+26.5	+35.2	+45.1			
44.0	1322	-24.5	-22.6	-14.8	-12.3	-9.6	-8.4	+2.0	+12.0	+19.4	+25.4	+33.4	+41.6	+46.0			
45.0	1305	-21.1	-19.6	-15.2	-12.1	-8.8	-7.7	+4.3	+12.4	+20.2	+24.4	+34.0	+49.4	+52.1			
46.0	1287	-24.0	-23.3	-14.6	-11.0	-8.5	-5.4	+5.2	+14.0	+21.3	+26.0	+39.1	+54.3	+61.0			
47.0	1261	-23.0	-18.3	-14.2	-11.4	-8.4	-7.5	+6.0	+14.7	+23.5	+29.1	+34.4	+50.3	+62.0			
48.0	1234	-24.0	-20.3	-15.3	-12.1	-8.3	-7.5	+6.1	+15.1	+25.9	+29.0	+34.5	+50.3	+62.0			
49.0	1214	-27.5	-24.4	-17.3	-14.3	-10.5	-8.6	+6.3	+15.1	+25.9	+29.0	+34.5	+50.3	+62.0			
50.0	1174	-39.5	-31.4	-17.6	-12.4	-8.4	-7.3	+6.3	+15.4	+24.2	+31.4	+34.4	+44.7	+53.6			
51.0	1131	-41.1	-37.5	-16.0	-12.6	-8.6	-11.6	+6.5	+15.7	+24.1	+24.0	+35.3	+44.6	+49.0			
52.0	1071	-45.7	-43.6	-18.1	-13.5	-9.0	-12.4	+6.3	+15.5	+24.0	+29.2	+35.1	+42.6	+51.0			
53.0	1011	-53.2	-49.6	-18.4	-14.4	-9.8	-13.2	+6.1	+15.2	+23.9	+30.4	+34.0	+47.6	+50.9			
54.0	924	-57.4	-30.7	-18.0	-14.4	-10.3	-13.3	+5.5	+15.0	+25.5	+32.0	+37.7	+50.7	+57.7			
55.0	840	-54.0	-23.6	-15.4	-11.5	-8.1	-11.5	+5.3	+15.5	+27.1	+31.4	+37.4	+43.0	+57.3			
56.0	743	-50.5	-24.4	-18.7	-12.4	-9.4	-11.4	+5.1	+15.5	+25.2	+32.4	+34.4	+44.0	+45.7			
57.0	640	-61.1	-28.6	-20.4	-12.8	-9.5	-11.4	+5.5	+17.1	+26.0	+30.4	+34.4	+47.6	+48.0			
58.0	515	-54.2	-24.4	-21.1	-13.5	-9.7	-11.4	+5.1	+15.7	+26.7	+30.1	+35.4	+50.2	+50.7			
59.0	393	-34.6	-24.4	-21.1	-13.5	-9.7	-11.4	+5.1	+15.7	+26.7	+30.1	+35.4	+50.2	+50.7			
60.0	273	-49.5	-31.3	-26.4	-14.5	-10.0	-11.4	+5.4	+14.0	+31.7	+34.0	+44.3	+49.7	+50.1			
61.0	184	-43.6	-31.1	-24.7	-17.8	-12.8	-11.4	+4.7	+19.6	+32.9	+43.7	+52.1	+54.7	+55.0			
62.0	124	-47.0	-28.6	-18.9	-14.0	-10.3	-11.4	+4.0	+29.1	+30.4	+34.4	+44.3	+49.7	+50.1			
63.0	76	-55.0	-34.3	-19.2	-11.0	-11.0	-11.0	+4.3	+20.0	+33.4	+37.4	+44.3	+49.7	+50.1			
64.0	44	-35.7	-20.8	-14.2	-11.4	-11.4	-11.4	+2.3	+20.2	+31.4	+34.4	+44.3	+49.7	+50.1			
65.0	34	-34.3	-20.8	-14.2	-11.4	-11.4	-11.4	+1.5	+15.0	+30.1	+34.4	+44.3	+49.7	+50.1			
66.0	29	-45.1	-24.4	-14.2	-11.4	-11.4	-11.4	+1.5	+15.0	+30.1	+34.4	+44.3	+49.7	+50.1			
67.0	25	-35.6	-36.6	-17.0	-11.0	-11.0	-11.0	+1.5	+15.0	+30.1	+34.4	+44.3	+49.7	+50.1			
68.0	29	-41.2	Positive is wind from the right (180°)	-24.4	-11.4	-11.4	-11.4	+1.5	+15.0	+30.1	+34.4	+44.3	+49.7	+50.1			
69.0	25	-41.0	Negative is wind from the left (360°)	-23.7	-12.0	-12.0	-12.0	+1.0	+12.0	+21.7	+33.4	+33.0	+44.3	+49.7			
70.0	25	-44.5		-32.7	-18.0	-18.0	-18.0	+4.5	+17.0	+24.4	+50.4	+51.0	+51.2	+51.3			

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.1

DATA SOURCE										JANUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.000	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-7.0			-6.4	-5.0	-4.1	-2.3	+0.0	+3.0	+5.3	+6.7	+7.6	+9.4	+10.0	
1.0	744	-14.0			-10.5	-8.9	-7.5	-5.0	+1.7	+8.5	+13.7	+16.2	+18.2	+21.9	+23.0	
2.0	744	-16.0			-6.7	-5.4	-4.0	-0.6	+5.0	+12.9	+17.4	+20.3	+22.2	+25.9	+28.0	
3.0	744	-9.0			-5.9	-4.3	-2.7	-0.9	+2.2	+8.7	+16.7	+22.5	+24.6	+32.4	+33.0	
4.0	744	-10.0			-5.9	-2.6	-0.8	+0.1	+5.1	+11.8	+20.8	+26.4	+30.2	+31.9	+36.4	
5.0	744	-7.0			-5.9	+1.8	-0.1	+3.1	+7.6	+15.2	+24.9	+30.8	+36.0	+38.8	+42.4	
6.0	744	-5.0			-4.9	-0.2	+2.4	+5.4	+10.4	+19.1	+28.3	+35.9	+39.6	+42.7	+51.9	
7.0	744	-6.0			-2.9	+0.3	+3.4	+7.2	+12.7	+22.6	+32.1	+41.2	+44.6	+48.8	+60.9	
8.0	744	-9.0			-1.9	+3.1	+5.9	+8.5	+15.2	+26.0	+36.9	+44.9	+49.8	+53.5	+73.0	
9.0	744	-5.0			-0.9	+2.7	+5.9	+9.2	+18.1	+28.7	+40.6	+50.3	+57.0	+64.5	+73.7	
10.0	744	-5.0			-2.9	+4.4	+7.9	+11.3	+19.8	+31.9	+44.1	+56.3	+65.0	+68.7	+83.0	
11.0	744	-3.0			-4.4	+8.5	+13.5	+22.5	+35.7	+50.1	+63.2	+68.5	+74.8	+79.9	+81.0	
12.0	744	+5.0			+5.0	+8.4	+11.1	+16.1	+24.4	+38.1	+52.0	+61.1	+68.0	+75.5	+84.9	
13.0	744	+9.0			+12.3	+15.7	+18.7	+26.9	+38.3	+51.2	+60.7	+67.0	+73.5	+84.9	+89.0	
14.0	744	+6.0			+7.0	+14.2	+16.7	+19.9	+26.0	+36.4	+47.8	+57.4	+64.5	+68.2	+77.9	
15.0	744	+10.0			+10.0	+13.4	+15.4	+17.9	+23.3	+32.2	+42.4	+50.2	+57.0	+62.2	+68.9	
16.0	744	+8.0			+11.0	+12.3	+14.7	+19.7	+27.6	+36.4	+43.3	+47.2	+52.5	+59.9	+65.0	
17.0	744	+2.0			+3.0	+7.7	+9.1	+10.6	+14.7	+22.1	+30.7	+35.6	+40.5	+43.6	+50.9	
18.0	744	+4.0			+1.9	+1.1	+2.8	+6.1	+9.5	+15.8	+23.7	+29.9	+34.0	+36.8	+40.9	
19.0	744	+5.0			-8.9	-1.2	-0.3	+1.2	+4.8	+10.5	+16.9	+24.2	+27.5	+32.2	+43.9	
20.0	744	+10.0			-4.9	-4.5	-2.1	-0.8	+1.3	+4.5	+12.6	+18.5	+21.6	+25.6	+37.9	
21.0	744	+14.0			-13.9	-9.1	-5.5	-2.6	+0.4	+4.1	+10.8	+17.5	+20.6	+23.1	+30.9	
22.0	744	+25.0			-18.9	-10.8	-9.0	-5.1	+1.4	+3.1	+9.5	+15.7	+20.0	+25.8	+34.9	
23.0	744	+22.0			-16.9	-11.8	-9.5	-7.5	-2.8	+2.7	+9.2	+15.8	+20.3	+25.5	+34.9	
24.0	744	+27.0			-20.9	-15.5	-12.5	-9.6	-4.2	+3.1	+10.1	+16.8	+21.0	+26.2	+33.9	
25.0	744	+30.0			-22.9	-15.7	-12.4	-9.0	-3.7	+3.7	+12.2	+18.9	+22.0	+25.6	+33.9	
26.0	744	+29.0			-25.9	-20.5	-15.0	-10.9	-3.7	+5.0	+15.5	+22.9	+27.0	+32.2	+42.9	
27.0	744	+32.0			-31.9	-22.5	-19.0	-12.8	-5.4	+5.4	+18.2	+24.9	+30.5	+33.2	+47.9	
28.0	105	+25.8				-23.8	-21.6	-18.6	-6.8	8.8	17.2	23.4	25.0	27.0	34.2	
29.0	107	+25.1				-25.0	-25.3	-22.0	-7.0	9.1	21.5	26.7	32.4	34.0	37.5	
30.0	108	+34.3				-29.0	-27.5	-23.4	-8.0	10.7	25.6	31.4	38.4	35.4	35.4	
31.0	109	+35.3				-31.0	-32.8	-29.4	-11.4	13.5	27.0	32.6	37.4	34.0	44.2	
32.0	113	+40.6				-34.0	-36.4	-31.7	-13.0	15.1	31.0	36.2	41.4	42.0	45.7	
33.0	116	+44.4				-40.8	-39.7	-35.6	-12.9	14.5	33.9	38.1	42.4	43.0	45.8	
34.0	117	+54.7				-50.8	-47.3	-42.1	-12.2	20.5	35.1	40.0	44.0	44.0	50.5	
35.0	116	+67.9				-62.8	-55.4	-50.1	-13.6	20.5	35.0	41.1	43.9	43.0	45.0	
36.0	116	+67.6				-63.8	-62.4	-52.2	-12.2	20.0	37.5	42.2	45.2	45.0	46.4	
37.0	114	+71.2				-68.0	-62.4	-56.3	-10.9	19.5	37.3	41.2	46.0	47.0	49.5	
38.0	116	+81.6				-67.4	-65.4	-57.2	-10.9	21.4	37.0	42.8	46.2	45.0	46.5	
39.0	117	+75.8				-72.4	-69.3	-61.1	-11.4	21.4	36.0	41.8	46.2	44.0	46.2	
40.0	116	+84.0				-67.4	-65.4	-55.2	-9.5	24.4	36.0	41.8	46.0	45.5	47.2	
41.0	117	+89.3				-66.8	-62.3	-47.1	-10.5	24.3	38.2	43.2	45.1	45.4	46.3	
42.0	114	+85.7				-65.0	-61.4	-40.3	-10.0	24.0	34.7	44.4	46.0	46.4	46.4	
43.0	113	+94.3				-63.0	-58.4	-36.3	-11.0	21.3	37.4	47.2	49.0	51.0	56.5	
44.0	113	+94.4				-58.0	-50.4	-39.3	-8.0	10.3	37.1	50.7	52.9	57.0	60.2	
45.0	111	+84.3				-52.0	-51.5	-37.4	-8.7	10.3	37.4	52.5	56.5	57.0	64.5	
46.0	110	+90.2				-60.0	-48.7	-28.5	-6.5	14.0	39.5	52.5	58.8	60.0	63.4	
47.0	106	+84.1				-59.0	-45.4	-26.7	-7.5	18.0	39.2	53.7	57.6	60.0	64.5	
48.0	104	+79.1				-53.0	-42.5	-24.8	-10.2	19.0	34.5	49.4	56.4	59.0	69.2	
49.0	100	+59.0				-59.0	-37.7	-22.0	-3.4	23.3	41.5	52.5	58.4	56.0	70.5	
50.0	100	+49.7				-50.0	-34.7	-22.0	-3.7	24.5	43.8	53.0	55.4	56.0	70.2	
51.0	96	+55.5				-31.8	-20.6	-4.0	24.8	46.0	55.0	57.8	60.5	60.9	61.0	
52.0	88	+55.7				-28.5	-20.6	-5.5	24.0	51.0	57.3	62.0	66.5	66.8	66.9	
53.0	83	+49.3				-19.1	-11.4	-4.8	31.5	53.2	57.0	67.1	70.2	70.9	71.1	
54.0	72	+61.9				-13.4	-8.8	-0.2	33.0	56.6	63.4	71.0	74.4	75.1	75.3	
55.0	64	+37.2				-17.5	-8.4	0.6	27.0	59.3	65.8	82.5	93.2	93.5	93.5	
56.0	57	+14.5				-9.9	-4.1	12.0	31.5	61.0	71.2	73.7	90.5	91.2	91.3	
57.0	46	+15.0				-10.0	-0.7	10.3	35.0	64.4	75.7	99.0	99.1	99.5	99.5	
58.0	26	1.5						7.3	12.0	37.0	64.9	85.7	125.0	126.0	126.1	
59.0	14	10.4							12.0	37.0	80.1	104.1	104.1	104.1	104.7	
60.0	10	11.1							25.6	34.0	56.4	74.7	75.1	75.2	75.4	
61.0	7	14.0							20.1	39.5	53.9	73.9	74.0	74.3	74.4	
62.0	4	24.0								42.0	69.0	69.7	69.8	69.9	70.0	
63.0	5	25.1								54.5	70.2	70.7	70.0	70.4	71.0	
64.0	4	24.7								43.0	60.3	60.6	60.7	60.7	60.7	
65.0	3	30.7								47.5	51.7	52.2	52.4	52.4	52.4	
66.0	3	24.8								50.4	51.1	51.3	51.4	51.4	51.4	
67.0	3	45.3								44.5	52.5	52.4	52.0	53.0	53.0	
68.0	4	34.5								47.0	104.2	104.4	104.5	104.5	104.5	
69.0	4	26.8								44.0	118.1	118.5	119.7	119.7	119.7	
70.0	4	20.2								36.0	121.2	121.5	121.5	121.5	121.5	

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.2

DATA SOURCE											FEBRUARY					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA						EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)				
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	678	-9.0			-7.7	-6.8	-5.4	-3.2	-0.1	3.1	5.4	6.8	8.0	9.5	10.0	
1.0	678	-18.0			-12.8	-9.9	-7.5	-3.9	1.3	9.6	15.1	17.4	20.4	25.5	26.0	
2.0	678	-13.0			-9.8	-6.9	-4.4	-0.5	5.5	13.1	20.4	24.3	28.0	32.0	33.0	
3.0	678	-10.0			-5.1	-4.2	-1.6	1.7	8.9	17.8	24.9	28.5	32.4	40.0	41.0	
4.0	678	-6.0			-4.6	-2.1	-0.6	3.9	11.4	22.0	28.7	33.9	40.1	50.0	51.0	
5.0	678	-6.0			-3.1	-0.9	0.4	6.1	14.8	25.5	34.0	38.7	47.1	64.0	65.0	
6.0	678	-6.0			-2.8	0.0	2.6	8.9	18.6	30.0	37.5	41.2	48.7	66.5	67.0	
7.0	678	-11.0			-2.2	2.0	5.0	11.2	22.4	33.9	43.6	49.7	53.2	78.0	79.0	
8.0	678	-11.0			-3.2	3.3	5.5	13.4	25.3	39.4	49.5	54.7	61.0	86.0	87.0	
9.0	678	-15.0			-0.6	2.8	6.7	15.8	29.2	44.4	55.2	59.7	68.4	88.0	89.0	
10.0	678	-14.0			-2.2	2.8	8.6	16.5	33.4	49.3	60.5	66.2	73.1	80.5	81.0	
11.0	678	-17.0			0.7	5.2	9.9	19.5	37.2	52.6	64.3	71.5	76.6	82.5	83.0	
12.0	678	-8.0			6.3	11.1	13.9	23.7	39.1	54.2	66.7	74.9	83.2	92.0	93.0	
13.0	678	-5.0			10.4	12.6	16.8	24.7	39.1	54.2	64.6	69.9	76.2	88.0	89.0	
14.0	678	-4.0			10.5	13.4	17.5	24.1	38.0	49.6	63.3	67.2	74.5	75.0	75.0	
15.0	678	-6.0			10.0	11.2	13.6	21.4	31.6	42.8	51.5	56.1	61.6	72.0	73.0	
16.0	678	-2.0			7.3	9.4	11.4	18.0	27.6	37.2	45.4	48.9	53.6	56.5	57.0	
17.0	678	-0.0			2.8	5.4	7.6	13.2	22.0	31.0	38.0	42.3	45.0	52.0	53.0	
18.0	678	-4.0			0.4	2.2	4.1	9.1	15.4	23.9	30.5	34.5	37.7	45.0	46.0	
19.0	678	-4.0			2.8	0.8	0.0	3.5	9.8	17.5	25.0	28.3	30.7	46.0	47.0	
20.0	678	-13.0			-8.7	-6.7	-4.2	-0.3	5.0	12.1	17.9	20.9	24.1	33.0	34.0	
21.0	678	-15.0			-10.6	-8.6	-5.8	-2.1	2.4	8.9	14.2	16.2	19.4	24.0	25.0	
22.0	678	-25.0			-12.8	-10.9	-8.2	-3.3	1.2	7.7	12.5	14.5	18.7	31.0	32.0	
23.0	678	-32.0			-14.2	-11.8	-9.7	-4.0	-0.6	4.3	10.8	14.1	16.7	21.0	22.0	
24.0	678	-21.0			-18.5	-14.2	-10.2	-4.5	11.0	17.2	11.0	13.5	17.1	20.0	21.0	
25.0	678	-28.0			-18.7	-15.3	-10.4	-4.8	11.3	17.8	12.3	14.6	16.5	23.0	24.0	
26.0	678	-32.0			-19.2	-16.1	-11.9	-4.4	12.1	18.7	13.4	16.1	18.5	25.0	26.0	
27.0	678	-41.0			-24.3	-17.5	-12.3	-5.2	12.7	10.0	16.2	18.8	21.5	25.0	26.0	
28.0	82	-11.9			-12.1	-9.9	-7.5	-2.5	5.0	17.7	18.2	21.1	23.2	23.0	24.0	
29.0	82	-11.9				-10.4	-8.2	-1.5	5.7	17.0	22.5	23.4	25.2	25.4	26.0	
30.0	81	-11.2			-11.2	-9.9	-7.5	-0.4	9.4	19.4	24.0	24.9	30.9	30.0	31.0	
31.0	81	-12.0			-11.2	-9.5	-7.5	2.2	13.4	22.1	27.5	29.4	33.4	34.2	34.4	
32.0	81	-12.5				-10.0	-7.5	2.0	14.8	25.7	29.7	35.2	34.4	39.2	39.4	
33.0	84	-15.8			-14.0	-11.4	-9.4	2.4	18.0	29.4	32.4	33.7	44.1	44.7	44.4	
34.0	94	-15.9			-12.9	-9.9	-7.5	1.5	19.0	31.5	33.2	35.0	43.5	44.2	44.0	
35.0	100	-11.2			-11.0	-9.0	-7.0	3.4	19.4	31.1	37.0	39.0	40.0	46.2	46.4	
36.0	102	-14.4			-14.0	-12.7	-9.4	6.1	19.4	31.4	34.4	41.7	45.0	51.0	52.0	
37.0	105	-17.6			-16.4	-14.6	-10.9	8.4	20.4	30.7	34.4	40.0	52.0	55.7	55.4	
38.0	107	-22.0			-21.0	-20.4	-12.4	7.4	21.4	32.7	34.7	45.4	47.0	54.1	53.3	
39.0	109	-25.8			-20.0	-19.4	-12.4	7.1	21.9	31.7	40.4	45.4	49.0	55.9	56.0	
40.0	109	-39.5			-19.0	-18.4	-15.4	6.3	25.2	34.2	38.9	44.4	53.0	59.4	60.0	
41.0	112	-49.7			-23.0	-23.2	-11.4	10.2	25.0	35.6	41.5	47.4	55.9	57.4	57.4	
42.0	109	-47.9			-19.0	-18.4	-10.4	10.4	25.4	35.2	44.4	51.4	56.0	60.1	60.3	
43.0	104	-34.7			-19.0	-18.4	-7.4	11.1	25.7	37.0	46.4	54.4	55.0	56.4	59.7	
44.0	104	-36.3			-15.0	-10.4	-7.7	10.9	26.0	40.2	50.4	53.4	55.4	55.4	55.4	
45.0	104	-40.8			-13.0	-11.4	-5.7	12.4	28.0	41.1	54.4	57.4	59.0	59.0	61.0	
46.0	102	-39.5			-16.0	-14.7	-1.4	12.3	28.0	41.4	54.4	58.7	62.0	72.2	72.4	
47.0	102	-27.6			-13.0	-9.7	-0.5	12.4	29.3	42.4	55.0	58.7	61.0	66.7	66.4	
48.0	94	-23.6			-8.4	0.9	0.9	13.0	31.0	45.0	57.1	61.0	70.0	71.4	71.5	
49.0	95	-17.9			1.1	1.9	1.9	14.0	33.1	49.4	58.4	64.4	74.0	74.4	75.0	
50.0	90	-10.4			0.0	2.5	14.1	14.1	33.4	49.2	55.4	62.0	76.1	76.9	77.1	
51.0	93	-15.9			-6.1	3.1	20.4	33.5	51.4	55.2	62.1	76.2	77.0	77.2	77.2	
52.0	80	-19.8			-1.2	5.0	20.7	35.0	56.2	59.0	65.4	76.2	76.4	76.9	76.9	
53.0	74	-15.8			-2.4	11.7	22.7	39.4	58.1	63.4	67.4	75.2	75.4	75.4	75.4	
54.0	64	-8.7			-6.4	13.3	-25.4	43.0	60.4	66.7	68.7	74.2	74.4	74.4	74.4	
55.0	60	-0.2			14.2	15.0	27.4	44.4	59.7	71.0	73.4	74.0	74.4	74.4	74.4	
56.0	50	8.0			19.1	21.5	27.9	48.0	64.1	71.4	85.4	85.4	86.0	86.0	86.0	
57.0	45	16.1			18.0	25.3	29.1	44.4	63.4	82.4	93.0	95.4	95.7	95.4	95.4	
58.0	39	17.8				22.0	29.2	48.4	61.6	78.1	95.1	95.7	95.1	95.1	95.1	
59.0	27	14.4				21.4	29.1	49.4	61.7	97.7	104.2	104.4	104.4	104.4	104.4	
60.0	20	12.3				12.0	20.2	52.0	80.4	94.0	104.6	104.4	104.4	104.4	104.4	
61.0	13	14.5					24.1	67.5	85.0	94.4	94.0	95.1	95.2	95.2	95.2	
62.0	7	7.9					25.1	81.5	88.4	92.4	92.4	92.4	92.4	92.4	92.4	
63.0	4	39.7						84.0	91.5	94.0	94.1	94.2	94.2	94.2	94.2	
64.0	2	83.8						89.0	85.4	86.0	86.1	86.1	86.1	86.1	86.1	
65.0	1	71.1														
66.0	2	52.5						52.0	64.4	64.4	64.4	64.4	64.4	64.4	64.4	
67.0	1	107.4														
68.0	3	107.8						113.4	114.4	116.4	116.4	116.4	116.4	116.4	116.4	
69.0	3	40.7						75.5	110.7	111.1	111.2	111.2	111.2	111.3	111.3	
70.0	3	34.0						72.8	130.4	130.4	130.4	131.0	131.0	131.0	131.0	

Positive is wind from the tail (285°).

Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.3

DATA SOURCE											MARCH					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM BBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-12.0	-9.9	-7.5	-6.2	-4.9	-3.2	-0.5	+2.4	+4.7	+6.2	+7.5	+8.9	+10.0		
100	744	-19.0	-18.9	-11.2	-8.8	-7.2	-4.3	+1.2	+8.4	+12.9	+15.2	+19.2	+22.9	+24.0		
200	744	-12.0	-10.9	-8.2	-6.3	-4.2	-0.5	+5.1	+12.7	+17.3	+20.5	+23.7	+26.9	+29.0		
300	744	-18.0	-13.9	-7.2	-3.7	-1.3	+1.4	+8.4	+16.7	+21.8	+25.8	+28.8	+31.4	+33.0		
400	744	-18.0	-14.9	-3.5	-1.0	-0.1	+3.4	+11.6	+20.8	+26.8	+31.3	+35.7	+39.9	+42.0		
500	744	-16.0	-14.9	-2.2	-0.0	+2.7	+6.8	+15.1	+25.7	+31.2	+35.5	+40.5	+44.9	+45.0		
600	744	-17.0	-13.9	-0.9	+1.3	+4.8	+10.1	+19.2	+29.2	+36.2	+40.4	+43.3	+45.4	+51.0		
700	744	-17.0	-11.9	-0.5	+2.7	+5.6	+13.2	+22.8	+33.6	+40.7	+45.0	+52.2	+57.6	+58.0		
800	744	-14.0	-12.9	-0.5	+3.8	+7.8	+15.3	+26.0	+37.6	+45.8	+51.0	+57.7	+66.9	+68.0		
900	744	-11.0	-7.9	+2.4	+6.3	+10.5	+17.5	+29.5	+43.0	+52.2	+59.0	+65.8	+79.9	+81.0		
1000	744	-8.0	+0.8	+0.8	+6.9	+11.0	+20.2	+33.7	+47.7	+58.7	+65.6	+71.5	+86.9	+109.0		
1100	744	-10.0	-9.9	+3.7	+8.9	+12.7	+23.0	+37.0	+51.6	+62.9	+71.0	+77.5	+94.9	+89.0		
1200	744	-5.0	-2.9	+6.8	+12.4	+16.4	+26.4	+39.6	+54.2	+65.3	+74.0	+80.8	+91.9	+94.0		
1300	744	+4.0	+11.4	+14.4	+19.6	+27.6	+40.2	+53.7	+61.7	+67.3	+78.5	+86.4	+87.0			
1400	744	+7.0	+6.0	+12.4	+15.4	+19.7	+25.5	+37.3	+48.9	+58.3	+64.2	+70.2	+77.9	+82.0		
1500	744	+8.0	+10.2	+13.1	+17.0	+22.9	+32.2	+42.5	+51.8	+57.1	+62.2	+70.9	+72.0			
1600	744	-12.0	+2.0	+7.2	+9.9	+13.1	+18.7	+27.4	+36.0	+43.6	+48.2	+52.5	+60.9	+65.0		
1700	744	-2.0	+0.0	+4.3	+6.3	+8.7	+13.7	+21.7	+30.5	+36.8	+40.6	+44.5	+49.9	+58.0		
1800	744	-7.0	-3.9	+0.2	+2.4	+4.3	+8.3	+14.9	+23.7	+29.4	+31.7	+34.2	+38.9	+56.0		
1900	744	-10.0	-9.9	+4.1	+1.6	+1.6	+2.9	+8.5	+16.0	+22.6	+25.7	+28.5	+30.9	+33.0		
2000	744	-17.0	-15.9	-9.1	-6.3	-3.1	-0.3	+4.2	+10.8	+15.7	+21.3	+24.8	+27.6	+28.0		
2100	744	-18.0	-12.6	-9.6	-6.8	-2.3	+1.7	+7.6	+11.9	+14.2	+17.5	+20.9	+23.0			
2200	744	-34.0	-32.9	-10.0	-7.2	-3.7	-0.3	+5.6	+9.4	+13.0	+16.5	+20.9	+24.0	+36.0		
2300	744	-41.0	-34.9	-14.8	-11.2	-8.8	-4.8	-0.5	+4.1	+8.1	+10.0	+14.5	+24.9	+32.0		
2400	744	-40.0	-32.9	-18.5	-14.3	-10.6	-5.1	-0.4	+4.4	+8.5	+10.5	+11.9	+16.9	+19.0		
2500	744	-37.0	-34.9	-24.1	-16.0	-10.9	-4.8	-0.2	+4.7	+9.7	+13.0	+18.3	+22.9	+24.0		
2600	744	-35.0	-33.9	-24.5	-17.6	-10.7	-4.7	-0.3	+6.5	+11.6	+16.2	+20.1	+30.9	+32.0		
2700	744	-6.0	-38.9	-30.1	-20.0	-12.2	-5.2	+0.9	+7.8	+12.3	+18.0	+21.1	+30.9	+32.0		
2800	80	-10.6			-8.0	-7.0	-3.5	0.0	11.2	14.0	17.0	20.1	21.1	21.2		
2900	93	-11.0			-8.0	-7.1	-2.9	5.4	13.7	17.0	18.0	22.1	23.0	23.1		
3000	97	-11.8			-6.4	-5.6	-0.7	6.0	16.4	19.0	22.9	29.5	29.5	29.5		
3100	98	-12.1			-6.4	-4.8	0.4	8.4	20.1	23.1	25.4	28.0	28.7	28.8		
3200	101	-12.1			-0.0	-7.7	-5.0	0.5	10.3	22.4	25.6	27.0	32.4	32.4		
3300	103	-10.5			-15.0	-8.7	-5.4	1.6	10.3	25.0	29.0	30.0	36.0	36.2		
3400	103	-21.7			-14.0	-12.7	-5.0	1.2	0.0	24.5	33.4	36.4	37.0	40.1		
3500	103	-14.8			-14.0	-11.4	-8.6	2.8	12.1	27.7	35.2	36.5	39.5	40.1		
3600	100	-13.7			-18.6	-12.9	-10.6	2.8	11.4	25.4	33.4	36.0	38.0	40.1		
3700	113	-10.0			-18.0	-13.8	-7.7	4.4	11.4	24.1	30.7	34.0	34.0	38.0		
3800	113	-20.6			-16.0	-12.4	-8.3	5.0	11.4	24.1	29.0	32.0	36.0	39.7		
3900	114	-21.0			-16.0	-15.4	-0.3	4.4	16.4	24.1	29.0	36.0	40.0	43.7		
4000	114	-21.3			-17.8	-14.7	-9.2	4.4	16.4	25.4	30.4	36.4	40.0	42.4		
4100	114	-23.0			-16.8	-15.4	-9.6	4.4	17.8	27.2	37.2	40.2	40.0	41.7		
4200	116	-23.3			-19.8	-16.4	-8.6	7.7	18.3	27.5	36.5	38.7	41.8	44.7		
4300	116	-22.8			-14.0	-12.4	-7.3	7.1	18.4	27.5	36.4	39.7	41.0	44.4		
4400	113	-21.1			-16.0	-9.4	-4.7	6.4	19.4	29.0	37.7	40.4	41.0	52.4		
4500	111	-17.3			-13.0	-7.5	-3.2	8.4	18.4	31.4	38.4	44.4	48.4	49.4		
4600	110	-12.6			-8.0	-7.5	-2.5	0.4	20.4	33.4	42.4	44.4	48.4	50.4		
4700	104	-7.2			-6.0	-5.4	-1.3	10.0	21.4	33.5	42.4	44.4	48.4	50.4		
4800	107	-5.6			-5.4	-4.4	1.2	12.6	23.7	34.7	42.4	44.4	47.0	63.2		
4900	105	-6.7			-6.0	-5.3	3.1	14.6	25.0	35.3	45.4	47.4	50.0	61.1		
5000	102	-14.0			-7.0	-4.7	2.7	16.2	27.7	37.4	44.0	49.7	51.0	60.2		
5100	97	-4.7				2.2	7.9	18.1	28.0	39.4	45.2	54.0	58.4	58.4		
5200	94	-6.2				4.1	9.7	20.7	31.2	41.7	46.4	54.0	57.0	57.7		
5300	87	-11.2				1.0	10.4	23.4	31.4	41.4	51.7	56.0	60.1	60.0		
5400	80	-12.6				2.4	9.0	25.7	39.4	44.4	54.4	58.4	62.2	62.4		
5500	64	-12.7				1.4	7.5	21.8	35.4	47.0	53.0	58.2	62.2	63.1		
5600	60	-16.0				3.4	7.0	22.0	35.4	47.7	54.0	58.0	61.4	62.4		
5700	51	-14.1				2.2	14.2	26.0	37.4	44.4	59.4	60.0	62.4	62.4		
5800	41	-4.8				2.4	24.4	24.4	37.4	44.4	54.0	67.1	67.4	67.9		
5900	39	-2.4				1.6	23.1	40.0	40.0	56.7	75.2	75.4	75.4	75.4		
6000	29	-2.5				0.1	22.2	40.0	57.5	63.4	75.7	75.1	75.4	75.4		
6100	14	-7.1					12.2	41.0	54.8	58.4	58.4	58.7	58.4	58.4		
6200	10	-1.2					6.1	41.0	44.4	44.4	53.4	63.2	63.4	63.4		
6300	7	-2.6						42.4	54.0	65.0	66.4	66.2	66.4	66.4		
6400	5	10.5						40.5	64.2	64.0	64.0	65.0	65.0	65.0		
6500	3	7.8						34.5	44.4	44.4	44.7	44.7	44.7	44.7		
6600	2	8.2						4.0	27.0	24.2	24.4	24.4	24.4	24.4		
6700	1	-12.1														
6800	1	1.1														
6900	1	-4.1														
7000	1	0.2														

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.4

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)	
5FC	720	-11.0		-7.4	-6.6	-5.7	-4.9	-1.6	+1.5	+3.7	+4.8	+5.9	+9.0	+10.0		
1.0	720	-14.0		-11.4	-10.5	-9.0	-8.3	-0.4	+0.4	+10.1	+14.7	+17.9	+23.0	+24.0		
2.0	720	-15.0		-11.6	-9.6	-6.9	-3.7	+1.7	+9.5	+14.0	+17.1	+19.9	+27.0	+28.0		
3.0	720	-15.0		-10.2	-8.5	-6.2	-2.0	+4.3	+13.0	+18.6	+22.0	+24.4	+39.0	+40.0		
4.0	720	-12.0		-9.9	-8.2	-4.8	-0.7	+7.0	+14.0	+22.3	+24.5	+29.4	+41.0	+42.0		
5.0	720	-13.0		-9.5	-6.5	-4.3	+0.0	+9.4	+19.4	+26.2	+29.7	+32.9	+49.0	+50.0		
6.0	720	-13.0		-9.7	-7.6	-3.5	+1.6	+12.6	+23.2	+30.1	+34.1	+37.8	+60.0	+61.0		
7.0	720	-18.0		-11.4	-5.9	-1.7	+3.5	+15.9	+26.7	+33.8	+39.8	+44.4	+63.0	+64.0		
8.0	720	-16.0		-10.7	-4.4	-0.6	+5.5	+18.5	+30.7	+39.5	+46.7	+49.8	+82.0	+83.0		
9.0	720	-14.0		-10.4	-4.8	-0.2	+6.4	+21.3	+34.9	+45.6	+53.1	+61.4	+86.0	+87.0		
10.0	720	-13.0		-8.2	-3.6	+0.5	+8.3	+24.0	+39.5	+50.0	+56.5	+63.9	+86.0	+87.0		
11.0	720	-15.0		-8.4	-1.6	+1.5	+9.8	+27.2	+44.3	+56.5	+62.7	+70.8	+83.0	+84.0		
12.0	720	-9.0		-3.5	-0.9	+2.3	+12.3	+30.5	+48.7	+60.3	+65.5	+72.9	+85.0	+86.0		
13.0	720	-5.0		-0.5	+2.0	+4.0	+15.3	+32.8	+48.8	+60.0	+65.7	+70.8	+87.0	+88.0		
14.0	720	-3.0		+1.2	+4.0	+8.0	+16.4	+30.5	+43.7	+55.4	+61.5	+68.4	+85.0	+86.0		
15.0	720	-1.0		+0.7	+3.4	+7.6	+14.9	+26.6	+38.7	+46.6	+52.6	+56.4	+63.0	+64.0		
16.0	720	-7.0		+1.2	+2.4	+5.3	+11.5	+21.6	+32.0	+39.1	+43.2	+46.8	+58.0	+59.0		
17.0	720	-9.0		+1.5	-0.4	+1.7	+7.7	+15.6	+25.0	+31.8	+34.9	+38.8	+53.0	+54.0		
18.0	720	-14.0		-6.5	-3.5	-0.9	+2.5	+9.4	+17.5	+23.5	+25.8	+29.4	+41.0	+42.0		
19.0	720	-11.0		-8.4	-6.9	-4.7	-0.8	+3.7	+10.6	+16.7	+21.5	+24.7	+30.0	+31.0		
20.0	720	-17.0		-10.2	-8.0	-6.3	-3.5	+0.4	+6.1	+11.1	+15.8	+18.6	+24.0	+27.0		
21.0	720	-19.0		-10.6	-9.5	-7.7	-4.9	-0.8	+3.7	+7.5	+10.2	+11.9	+18.0	+19.0		
22.0	720	-17.0		-12.1	-10.0	-8.9	-6.3	-2.0	+1.8	+5.2	+8.3	+10.4	+15.0	+16.0		
23.0	720	-19.0		-14.4	-11.0	-9.1	-6.9	-2.7	+1.0	+4.8	+7.2	+9.9	+22.0	+23.0		
24.0	720	-20.0		-14.5	-12.7	-10.2	-7.4	-2.6	+1.0	+5.0	+7.7	+10.1	+11.5	+12.0		
25.0	720	-22.0		-16.7	-13.5	-11.2	-7.4	-2.1	+1.9	+6.0	+8.3	+10.2	+11.7	+12.0		
26.0	720	-27.0		-19.7	-15.1	-12.5	-8.5	-1.4	+3.5	+7.5	+8.8	+10.2	+14.0	+17.0		
27.0	720	-25.0		-19.7	-16.7	-12.8	-8.1	-0.7	+4.9	+8.6	+10.6	+12.2	+17.5	+18.0		
28.0	94	-20.2		-16.4	-14.1	-10.3	-0.3	0.3	7.3	11.7	12.0	14.7	15.4	15.5		
29.0	94	-18.2		-15.7	-14.0	-7.4	1.3	9.4	13.4	13.4	15.7	18.0	19.0	19.1		
30.0	101	-15.6		-15.0	-13.7	-12.0	-7.5	2.3	11.6	16.9	18.0	19.7	20.3	20.4		
31.0	107	-17.7		-14.0	-13.3	-10.9	-6.5	3.0	13.0	16.9	18.4	20.3	24.4	25.0		
32.0	106	-14.2		-13.0	-12.3	-10.9	-6.2	4.7	13.7	17.4	18.4	20.0	24.4	25.0		
33.0	104	-14.0		-13.0	-12.4	-10.3	-5.0	4.3	14.2	19.5	21.4	25.0	26.9	27.0		
34.0	103	-14.1		-12.0	-11.6	-7.4	-3.4	4.0	15.2	22.4	24.0	27.0	29.4	29.7		
35.0	110	-12.9		-12.0	-12.2	-7.7	-0.3	6.3	17.5	23.5	26.7	29.0	37.4	37.5		
36.0	112	-16.6		-10.0	-8.5	-5.0	-0.0	5.3	16.7	24.4	28.4	30.0	40.1	40.3		
37.0	112	-11.6		-10.9	-9.7	-7.4	-0.0	5.0	14.5	20.5	25.4	26.0	32.5	32.5		
38.0	114	-14.8		-10.0	-9.4	-7.4	-4.6	5.1	14.0	21.3	25.0	25.0	34.2	34.5		
39.0	112	-17.7		-15.0	-14.5	-13.3	-4.7	5.7	13.7	19.7	22.7	25.0	30.4	30.9		
40.0	112	-14.5		-17.5	-15.5	-14.2	-6.2	6.2	14.1	22.1	26.0	26.0	35.0	35.1		
41.0	111	-16.0		-15.0	-15.2	-13.7	-6.5	6.4	14.1	22.2	26.0	25.0	30.5	30.5		
42.0	112	-17.4		-15.0	-15.2	-13.5	-7.4	3.4	14.7	21.7	25.4	29.0	30.4	30.9		
43.0	112	-14.1		-15.5	-14.1	-11.7	-6.7	4.0	15.4	25.2	27.7	28.0	35.4	36.4		
44.0	111	-22.2		-17.0	-17.2	-14.7	-0.4	2.5	14.3	22.5	30.4	31.0	33.2	33.4		
45.0	110	-21.0		-20.0	-18.4	-16.5	-10.5	3.3	15.4	20.5	32.4	33.0	36.4	36.9		
46.0	107	-27.1		-18.0	-17.6	-14.2	-0.4	3.4	16.7	21.3	33.0	42.0	43.4	44.0		
47.0	104	-19.1		-17.4	-13.9	-9.1	3.0	14.3	14.3	27.4	37.4	44.0	47.1	47.3		
48.0	103	-18.8		-18.0	-15.7	-12.4	-4.3	5.1	13.2	29.0	40.7	44.0	44.7	48.4		
49.0	103	-22.9		-22.0	-16.7	-13.0	-4.3	5.4	14.2	34.4	43.7	45.0	46.2	47.3		
50.0	100	-22.9		-23.0	-18.7	-15.0	-4.7	5.2	19.1	30.0	43.7	45.0	46.2	46.4		
51.0	100	-22.4		-22.0	-19.7	-16.0	-9.0	4.4	15.1	35.0	42.7	44.0	44.7	44.9		
52.0	94	-21.1		-18.4	-15.1	-11.4	-8.5	5.3	17.5	40.1	41.0	44.0	45.1	45.3		
53.0	92	-18.6		-17.5	-16.2	-14.2	-6.1	6.5	14.5	36.4	40.0	42.4	43.1	43.1		
54.0	80	-18.3		-15.2	-14.0	-12.0	-5.2	7.6	21.4	34.4	41.4	42.4	42.4	42.4		
55.0	75	-23.7		-21.3	-14.7	-11.4	-5.6	9.5	25.1	34.3	41.3	42.2	42.2	43.0		
56.0	63	-27.5		-18.4	-13.9	-10.0	-4.0	12.2	25.0	39.0	43.0	43.5	43.7	43.7		
57.0	52	-17.3		-15.4	-9.4	-3.0	-1.0	14.0	22.7	34.4	43.4	45.3	45.6	45.6		
58.0	44	-13.4		-7.2	-2.2	-1.3	-1.0	24.7	39.0	42.0	70.4	70.4	70.4	70.4		
59.0	35	-16.6		-13.2	-6.7	-1.4	-1.4	23.6	35.3	40.3	40.3	41.2	41.2	41.2		
60.0	25	-20.5		-10.7	-4.0	-1.4	-1.4	31.0	34.7	35.0	35.1	35.2	35.2	35.2		
61.0	14	-24.3		-14.4	-14.0	-14.0	-14.0	30.2	30.2	30.2	30.2	30.2	30.2	30.2		
62.0	4	-24.2		-15.7	-11.0	-11.0	-11.0	21.7	35.4	35.0	35.0	35.0	35.0	35.0		
63.0	4	-12.5		-4.0	-4.0	-4.0	-4.0	23.3	23.3	23.3	23.3	23.3	23.3	23.3		
64.0	4	-6.6		-5.0	-5.0	-5.0	-5.0	30.5	31.1	31.2	31.3	31.3	31.3	31.3		
65.0	2	-2.8		-3.0	-3.0	-3.0	-3.0	3.3	3.3	3.3	3.3	3.3	3.3	3.3		
66.0	2	-21.1		-21.0	-21.0	-21.0	-21.0	-3.1	-3.1	-3.0	-3.0	-3.0	-3.0	-3.0		
67.0	2	-7.8		-4.0	-4.0	-4.0	-4.0	-2.5	-2.5	-2.4	-2.4	-2.4	-2.4	-2.4		
68.0	2	-10.1		-10.0	-10.0	-10.0	-10.0	-15.3	-15.3	-15.3	-15.3	-15.3	-15.3	-15.3		
69.0	2	-31.5		-32.0	-20.5	-20.5	-20.5	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3		
70.0	2	-44.3		-44.0	-22.4	-22.4	-22.4	-21.7	-21.7	-21.4	-21.4	-21.4	-21.4	-21.4		

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.5

DATA SOURCE										MAY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE 15.900	PERCENTAGE 50.000	FREQUENCY 84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	744	-11.0	-9.9	-7.6	-6.8	-5.9	-4.4	-1.8	+0.1	+2.0	+3.4	+4.9	+8.9	+10.0		
100	744	-12.0		-10.6	-9.7	-8.6	-6.7	-1.2	+3.2	+6.6	+9.4	+12.1	+15.9	+17.0		
200	744	-14.0	-13.9	-10.7	-9.1	-7.3	-4.2	-0.3	+4.5	+8.3	+11.2	+14.5	+18.9	+19.0		
300	744	-15.0	-13.9	-9.6	-7.7	-6.2	-3.3	-0.0	+5.8	+10.1	+14.3	+16.8	+20.9	+23.0		
400	744	-11.0	-10.9	-8.3	-7.1	-5.6	-2.6	+0.9	+7.1	+12.8	+16.5	+20.2	+23.9	+25.0		
500	744	-10.0	-9.9	-7.2	-6.3	-4.8	-1.6	+2.1	+9.3	+15.2	+19.2	+21.7	+26.9	+31.0		
600	744	-11.0		-7.9	-6.4	-4.5	-0.8	+3.8	+11.3	+18.1	+21.2	+24.6	+28.9	+31.0		
700	744	-12.0	-11.9	-8.5	-6.2	-3.9	-0.5	+5.4	+13.3	+20.4	+23.5	+26.5	+29.9	+35.0		
800	744	-15.0	-13.9	-8.8	-6.4	-4.0	-0.2	+7.0	+15.4	+22.6	+25.9	+29.1	+33.9	+39.0		
900	744	-15.0	-13.9	-9.6	-6.5	-3.5	-0.0	+8.5	+18.3	+25.4	+29.0	+31.5	+36.9	+38.0		
1000	744	-16.0	-14.9	-10.5	-6.7	-3.4	-0.9	+10.5	+21.3	+29.4	+33.5	+37.0	+42.9	+44.0		
1100	744	-17.0		-10.5	-6.0	-3.3	-2.5	+12.3	+24.8	+33.3	+40.0	+42.1	+46.9	+48.0		
1200	744	-19.0	-18.9	-9.8	-6.4	-2.7	+4.0	+14.8	+29.1	+37.9	+40.7	+46.2	+54.4	+55.0		
1300	744	-20.0	-14.9	-8.5	-4.8	-0.9	+5.5	+17.4	+31.0	+39.9	+44.7	+51.2	+58.9	+59.0		
1400	744	-14.0	-13.9	-6.7	-1.5	+1.3	+6.7	+17.5	+28.9	+36.7	+41.5	+43.8	+48.9	+53.0		
1500	744	-13.0	-9.9	-3.8	-0.8	+0.4	+6.4	+15.4	+23.7	+29.2	+33.5	+35.9	+41.9	+48.0		
1600	744	-9.0		-5.7	-3.7	-0.7	+4.2	+11.0	+19.1	+24.0	+25.7	+28.1	+31.4	+32.0		
1700	744	-14.0	-8.9	-6.2	-4.6	-2.3	-0.8	+6.7	+13.1	+17.7	+20.0	+21.8	+24.9	+30.0		
1800	744	-16.0	-15.9	-7.9	-6.9	-4.8	-1.5	+2.3	+7.9	+11.6	+13.3	+14.9	+18.9	+27.0		
1900	744	-12.0	-11.9	-9.7	-8.4	-6.6	-1.2	-0.5	+3.6	+7.1	+9.1	+10.1	+13.9	+20.0		
2000	744	-18.0	-12.9	-10.9	-10.0	-8.6	-6.0	-2.4	+1.0	+3.9	+5.9	+7.5	+11.9	+14.0		
2100	744	-24.0	-16.9	-13.3	-12.0	-10.2	-7.7	-4.3	-0.3	+1.8	+3.4	+5.5	+7.9	+11.0		
2200	744	-21.0		-14.8	-13.2	-11.5	-9.2	-5.3	-0.9	+0.6	+1.9	+2.8	+5.9	+17.0		
2300	744	-19.0		-16.5	-14.2	-13.0	-10.1	-5.9	-1.6	-0.1	+0.8	+1.9	+5.9	+14.0		
2400	744	-23.0	-19.9	-17.2	-15.6	-13.7	-11.0	-6.4	-2.0	-0.0	+1.4	+3.8	+4.9	+6.0		
2500	744	-19.0		-18.5	-16.2	-14.5	-11.6	-6.6	-1.5	+0.4	+2.1	+3.8	+7.9	+9.0		
2600	744	-23.0	-22.9	-19.5	-17.1	-15.4	-12.0	-6.6	-1.5	+1.2	+2.9	+4.5	+8.9	+10.0		
2700	744	-24.0	-23.9	-20.5	-18.6	-16.2	-12.0	-6.2	-0.7	+1.8	+4.0	+5.9	+8.9	+10.0		
2800	103	-24.9		-22.0	-20.0	-19.0	-18.4	-6.7	0.7	3.0	7.7	10.0	12.9	13.1		
2900	105	-26.9		-25.0	-21.0	-21.2	-18.4	-6.2	1.3	5.0	8.6	13.0	14.7	14.8		
3000	105	-22.4		-21.0	-19.7	-19.7	-18.7	-5.8	3.1	7.0	9.6	12.0	15.0	16.1		
3100	107	-24.5		-21.0	-20.3	-16.6	-13.3	-5.1	4.0	10.4	14.6	17.4	17.7	17.8		
3200	110	-25.3		-21.0	-18.7	-15.7	-13.4	-4.0	4.0	10.5	15.8	19.5	15.1	15.1		
3300	112	-25.7		-21.0	-19.5	-17.4	-12.2	-5.3	4.4	9.4	12.0	12.0	14.6	14.7		
3400	113	-32.3		-20.0	-20.2	-18.3	-12.4	-4.2	5.7	9.1	12.0	13.0	15.2	15.4		
3500	113	-24.4		-22.0	-21.5	-20.2	-18.2	-4.1	5.7	9.7	11.0	13.7	14.1	14.2		
3600	113	-21.7		-20.0	-20.2	-18.2	-15.0	-5.5	6.2	9.4	12.0	14.0	14.0	15.5	15.6	
3700	114	-24.3		-20.0	-20.2	-18.4	-15.7	-6.0	5.0	9.3	12.0	13.0	17.7	17.8		
3800	112	-22.4		-20.0	-20.4	-19.7	-14.0	-6.8	3.6	9.4	12.0	13.0	24.7	24.9		
3900	112	-24.0		-22.4	-21.4	-21.4	-15.6	-8.2	0.6	9.4	12.7	13.0	18.1	18.3		
4000	114	-26.3	-25.4	-24.4	-21.2	-17.0	-12.0	-0.8	-1.2	6.3	12.7	13.0	16.0	16.2		
4100	116	-26.9	-25.4	-26.2	-24.2	-19.7	-11.5	-3.5	3.9	4.6	10.4	11.7	11.8	11.8		
4200	116	-31.0	-30.4	-25.7	-23.4	-20.4	-12.2	-4.5	5.0	9.0	9.0	10.0	10.0	10.0		
4300	113	-27.9	-26.0	-25.4	-24.4	-22.0	-14.2	-5.5	3.2	4.4	11.0	14.1	14.3	14.3		
4400	112	-30.6	-29.0	-29.5	-26.4	-24.2	-16.0	-6.0	0.4	4.6	12.0	14.2	14.4	14.4		
4500	111	-32.3	-31.0	-30.5	-28.7	-24.7	-17.3	-6.2	-0.2	4.6	6.9	11.4	12.0	12.0		
4600	104	-34.4	-33.0	-32.5	-31.4	-26.5	-17.4	-7.1	0.4	4.6	5.0	17.0	19.1	19.1		
4700	107	-34.6	-33.0	-32.4	-30.6	-26.7	-17.4	-7.0	-0.1	2.6	6.9	15.0	16.0	16.0		
4800	106	-37.2	-33.0	-32.4	-30.0	-26.1	-17.3	-0.4	-0.3	3.6	4.4	15.6	15.6	15.6		
4900	104	-36.8	-35.0	-34.3	-33.3	-27.4	-18.2	-11.5	-2.2	5.4	7.0	10.0	11.0	11.0		
5000	100	-36.7	-35.0	-34.0	-30.3	-24.0	-19.5	-12.4	-5.0	2.7	4.0	7.8	7.9	7.9		
5100	94	-39.1	-35.0	-35.0	-30.5	-21.4	-12.1	-1.0	2.0	4.0	9.2	9.4	9.4	9.4		
5200	96	-41.0	-39.4	-35.6	-29.5	-21.7	-10.0	-1.7	5.0	17.0	17.7	17.8	17.8	17.8		
5300	90	-42.9	-40.0	-38.2	-31.2	-20.6	-10.3	-1.5	2.0	22.1	22.5	22.6	22.6	22.6		
5400	85	-40.6	-40.5	-38.4	-30.0	-19.7	-11.4	-4.1	6.1	9.2	10.2	10.4	10.4	10.4		
5500	74	-45.7	-41.7	-40.6	-30.6	-20.4	-9.0	-4.7	0.3	16.2	16.7	16.8	16.8	16.8		
5600	64	-42.0	-41.5	-39.8	-35.6	-20.0	-6.0	0.7	1.7	4.5	5.4	5.4	5.4	5.4		
5700	57	-44.3	-41.1	-35.6	-20.3	-6.5	3.2	5.7	15.3	15.6	15.7	15.7	15.7	15.7		
5800	43	-46.4	-42.4	-36.2	-22.7	-8.4	5.0	29.0	29.7	30.1	30.2	30.2	30.2	30.2		
5900	33	-46.1	-38.3	-34.0	-20.7	-5.2	10.4	12.4	13.0	13.1	13.2	13.2	13.2	13.2		
6000	20	-47.5	-44.0	-38.0	-24.0	-5.4	6.4	12.4	13.0	13.1	13.2	13.2	13.2	13.2		
6100	12	-46.7	-45.1	-34.0	-18.0	3.1	6.3	6.6	6.7	6.8	6.8	6.8	6.8	6.8		
6200	9	-45.6														
6300	2	-42.4														
6400	2	-37.4														
6500	2	-32.4														
6600	1	-32.8														
6700	1	-32.0														
6800	1	-35.6														
6900	1	-42.4														
7000	1	-42.0														

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.6

DATA SOURCE											JUNE					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	720	-10.0			-7.6	-6.5	-5.3	-3.9	-1.0	+0.1	+1.7	+3.1	+3.9	+8.0	+9.0	
1.0	720	-25.0			-9.1	-8.0	-7.0	-4.6	-0.7	+3.2	+6.5	+10.7	+10.7	+19.0	+19.0	
2.0	720	-20.0			-8.4	-7.2	-5.9	-3.5	+0.0	+4.1	+7.2	+9.4	+11.8	+24.0	+25.0	
3.0	720	-16.0			-8.4	-6.5	-5.2	-2.6	+0.4	+4.7	+8.4	+10.3	+12.9	+21.0	+22.0	
4.0	720	-15.0			-6.9	-6.1	-4.8	-2.4	+0.6	+5.5	+9.2	+12.0	+13.6	+21.0	+22.0	
5.0	720	-12.0			-7.3	-6.1	-5.0	-2.5	+1.0	+6.4	+10.1	+12.1	+13.9	+19.0	+20.0	
6.0	720	-11.0			-8.1	-6.8	-5.3	-2.4	+1.4	+6.7	+11.0	+13.5	+16.6	+19.0	+20.0	
7.0	720	-15.0			-7.8	-6.9	-5.8	-2.4	+2.0	+8.3	+12.7	+15.3	+18.4	+21.5	+22.0	
8.0	720	-13.0			-9.7	-8.4	-6.7	-2.5	+2.2	+9.0	+14.7	+18.4	+20.7	+24.0	+25.0	
9.0	720	-14.0			-11.2	-9.5	-7.0	-3.0	+2.9	+10.8	+18.0	+20.7	+22.9	+31.0	+32.0	
10.0	720	-19.0			-13.8	-11.1	-9.0	-3.1	+3.8	+12.7	+20.5	+22.9	+26.9	+33.0	+34.0	
11.0	720	-24.0			-17.8	-13.4	-9.0	-3.4	+4.1	+14.5	+23.5	+28.1	+30.7	+37.0	+38.0	
12.0	720	-29.0			-18.3	-15.2	-10.1	-3.5	+5.3	+18.3	+27.1	+32.2	+34.8	+41.0	+42.0	
13.0	720	-28.0			-20.3	-16.3	-10.5	-2.6	+6.5	+18.8	+29.7	+32.9	+37.9	+46.0	+47.0	
14.0	720	-24.0			-18.8	-15.8	-10.7	-2.4	+6.1	+18.8	+27.4	+30.6	+34.6	+46.0	+47.0	
15.0	720	-26.0			-16.7	-13.9	-10.0	-2.8	+4.2	+14.2	+22.4	+25.1	+26.7	+30.0	+31.0	
16.0	720	-20.0			-12.9	-11.2	-9.2	-4.2	+1.4	+8.0	+13.9	+16.0	+17.7	+19.6	+20.0	
17.0	720	-16.0			-12.8	-11.1	-9.2	-5.5	-0.7	+3.4	+6.7	+8.5	+9.6	+13.5	+14.0	
18.0	720	-16.0			-13.9	-11.9	-10.1	-7.7	-3.6	-0.1	+2.2	+3.5	+4.4	+8.0	+9.0	
19.0	720	-17.0			-14.3	-13.2	-11.9	-10.0	-6.0	-2.4	-0.5	-0.0	+1.6	+2.7	+3.0	
20.0	720	-22.0			-18.2	-15.6	-13.9	-11.6	-7.8	-4.2	-2.3	-1.3	-0.5	+2.5	+3.0	
21.0	720	-24.0			-18.6	-16.7	-15.5	-12.9	-9.5	-5.5	-3.2	-1.6	-0.2	+2.5	+3.0	
22.0	720	-21.0			-18.9	-17.9	-16.8	-14.6	-10.7	-7.1	-4.3	-2.7	-1.3	+0.0	+1.0	
23.0	720	-24.0			-20.4	-19.6	-18.0	-15.6	-11.9	-8.1	-5.9	-3.9	-2.0	+6.0	+7.0	
24.0	720	-24.0			-21.1	-20.4	-19.2	-16.7	-12.6	-8.4	-5.8	-4.0	-2.3	+0.0	+1.0	
25.0	720	-27.0			-23.1	-21.1	-20.1	-18.0	-13.3	-8.6	-6.1	-4.3	-2.2	-0.3	+0.0	
26.0	720	-30.0			-24.3	-22.4	-20.8	-18.5	-13.4	-8.8	-6.4	-4.4	-2.5	-0.9	+0.0	
27.0	720	-29.0			-25.1	-23.7	-21.9	-18.9	-13.8	-8.2	-5.5	-3.7	-1.2	+0.0	+1.0	
28.0	103	-27.5			-27.0	-25.7	-22.0	-20.0	-15.2	-8.3	-3.5	-2.4	0.5	0.4	1.0	
29.0	104	-26.8			-26.8	-25.3	-22.9	-20.2	-15.1	-9.1	-4.2	-0.6	1.0	1.4	1.9	
30.0	107	-27.3			-26.0	-25.8	-24.6	-20.0	-15.6	-9.7	-3.7	-1.0	-0.4	0.2	0.3	
31.0	104	-30.2			-29.0	-27.5	-25.9	-21.4	-15.7	-8.7	-4.4	-3.7	-3.0	-1.5	-1.4	
32.0	104	-32.0			-28.0	-26.8	-24.8	-21.5	-16.1	-8.1	-5.1	-2.9	-1.4	-1.2	-1.1	
33.0	104	-30.1			-29.0	-28.5	-27.3	-22.5	-15.5	-8.1	-4.0	-0.1	-2.1	-1.1	-0.9	
34.0	110	-30.1			-29.0	-28.5	-26.5	-23.4	-16.3	-8.2	-4.4	-1.5	-0.1	7.1	7.3	
35.0	111	-34.6			-31.0	-33.2	-28.4	-23.3	-17.7	-9.5	-5.8	-1.0	-1.1	0.1	0.3	
36.0	111	-35.7			-31.0	-32.5	-30.2	-24.7	-19.4	-11.4	-5.0	-8.5	-3.1	-1.3	-1.2	
37.0	110	-35.1			-34.0	-34.2	-31.5	-27.5	-20.4	-12.0	-9.7	-6.5	-5.1	-4.3	-4.1	
38.0	110	-36.0			-35.0	-35.2	-34.2	-29.3	-21.0	-14.0	-10.4	-9.4	-9.1	-5.4	-5.5	
39.0	110	-39.8			-37.0	-35.5	-34.2	-29.0	-22.0	-17.1	-13.2	-9.5	-8.5	-7.0	-7.4	
40.0	110	-40.9			-38.0	-36.5	-33.8	-31.8	-24.8	-14.5	-13.5	-12.6	-12.0	-11.0	-10.4	
41.0	110	-46.7			-40.7	-38.9	-36.9	-34.2	-26.3	-20.5	-15.7	-11.5	-10.1	-7.3	-7.1	
42.0	104	-47.1			-44.5	-40.5	-39.5	-35.2	-27.8	-21.4	-19.1	-17.2	-16.1	-13.5	-13.5	
43.0	104	-46.4			-45.0	-45.3	-42.3	-38.4	-30.4	-23.9	-19.7	-17.5	-16.1	-15.3	-15.2	
44.0	104	-47.5			-47.5	-47.3	-44.5	-40.7	-32.7	-25.0	-21.7	-21.0	-20.4	-20.3	-20.2	
45.0	104	-54.6			-51.0	-48.5	-45.2	-41.9	-34.4	-27.4	-24.1	-21.7	-21.0	-20.5	-20.4	
46.0	104	-56.5			-51.0	-52.3	-47.3	-44.2	-36.3	-28.4	-24.7	-21.2	-21.1	-19.2	-19.1	
47.0	107	-55.3			-54.0	-53.5	-49.8	-46.7	-37.7	-29.5	-24.3	-22.0	-21.1	-19.4	-19.5	
48.0	101	-56.7			-56.0	-55.4	-52.5	-48.5	-38.4	-30.5	-27.0	-24.6	-23.0	-20.0	-19.4	
49.0	100	-61.0			-57.7	-55.0	-54.0	-49.4	-38.7	-32.4	-24.0	-22.4	-21.4	-21.0	-20.9	
50.0	92	-61.3			-54.2	-54.2	-55.4	-49.4	-38.5	-30.4	-26.4	-24.6	-21.0	-20.4	-20.7	
51.0	84	-74.5			-61.0	-56.4	-50.4	-40.5	-29.5	-26.1	-23.6	-21.0	-21.0	-20.4	-20.4	
52.0	80	-70.9			-65.2	-59.0	-51.7	-40.7	-29.0	-24.0	-22.0	-19.4	-19.4	-19.2	-19.1	
53.0	75	-63.3			-68.3	-62.2	-52.5	-40.0	-31.4	-24.4	-23.7	-19.7	-19.7	-19.4	-19.4	
54.0	73	-62.6			-62.3	-56.8	-52.8	-43.1	-32.6	-25.4	-16.7	-12.7	-11.9	-11.4	-11.4	
55.0	70	-62.3			-56.9	-56.9	-53.0	-44.0	-34.1	-25.5	-20.4	-17.7	-17.7	-17.7	-17.7	
56.0	66	-62.0			-60.6	-60.6	-50.4	-44.2	-35.2	-26.3	-23.5	-21.4	-21.4	-21.4	-21.3	
57.0	62	-63.9			-61.4	-60.9	-55.2	-41.5	-29.4	-20.1	-17.0	-17.0	-17.0	-17.0	-17.0	
58.0	52	-64.5			-63.4	-63.4	-58.4	-41.7	-31.3	-20.4	-15.4	-9.9	-23.3	23.6	23.5	
59.0	40	-63.7			-59.0	-59.0	-53.7	-44.5	-34.3	-24.3	-11.0	-11.0	-11.0	-11.0	-11.0	
60.0	31	-79.2			-64.4	-64.4	-58.4	-49.5	-39.0	-29.0	-16.4	-16.4	-16.4	-16.4	-16.4	
61.0	23	-77.6			-68.9	-68.9	-65.0	-55.0	-47.5	-35.4	-24.3	-11.4	-11.4	-11.4	-11.4	
62.0	14	-76.4						-71.0	-47.0	-36.2	-2.3	-2.3	-2.3	-2.3	-2.3	
63.0	6	-72.5							-53.0	-42.0	-11.4	-11.4	-11.4	-11.4	-11.4	
64.0	2	-63.6							-64.0	-48.1	-47.0	-47.0	-47.0	-47.0	-47.0	
65.0	2	-60.9							-70.0	-49.2	-48.9	-48.9	-48.9	-48.9	-48.9	
66.0	1	-50.6														
67.0	1	-49.5														
68.0	1	-47.8														
Positive is wind from the tail (285°). Negative is wind from the head (105°).																

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.7

DATA SOURCE										JULY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION (MSL)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM DBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE 15.900	PERCENTAGE 50.000	FREQUENCY 84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-8.0	-7.9	-6.1	-5.1	-4.7	-3.4	-0.8	-0.1	+1.6	+2.9	+4.1	+6.9	+8.0		
100	744	-12.0	-11.9	-10.1	-9.5	-8.8	-4.0	-0.4	+3.4	+6.5	+8.2	+10.5	+13.9	+16.0		
200	744	-17.0	-13.9	-10.7	-7.7	-6.2	-3.2	-0.1	+3.8	+6.9	+8.3	+11.2	+13.9	+18.0		
300	744	-16.0	-11.9	-9.3	-7.8	-5.8	-2.6	-0.0	+4.0	+7.6	+9.4	+10.6	+13.9	+19.0		
400	744	-12.0	-9.1	-7.4	-6.0	-2.9	-0.1	+4.2	+8.2	+10.0	+12.1	+17.4	+18.0			
500	744	-10.0	-8.8	-7.7	-6.1	-3.5	-0.1	+4.6	+7.7	+10.0	+12.7	+17.4	+18.0			
600	744	-18.0	-11.9	-10.5	-8.0	-6.2	-3.8	-0.2	+4.4	+7.4	+10.2	+12.8	+17.4	+18.0		
700	744	-14.0	-12.9	-10.1	-9.3	-7.5	-4.3	-0.4	+4.0	+6.9	+9.3	+11.1	+17.4	+18.0		
800	744	-18.0	-14.9	-11.9	-10.1	-8.2	-5.0	-0.5	+3.7	+7.7	+9.7	+11.7	+16.9	+18.0		
900	744	-22.0	-17.9	-14.8	-12.6	-10.1	-6.1	-0.6	+3.9	+8.0	+11.0	+13.1	+16.9	+19.0		
1000	744	-26.0	-24.9	-17.7	-14.5	-11.6	-7.1	-0.6	+4.5	+9.2	+12.1	+14.7	+18.4	+19.0		
1100	744	-28.0	-19.5	-17.0	-13.5	-8.2	-0.7	+5.3	+10.2	+13.2	+16.2	+20.9	+22.0			
1200	744	-31.0	-24.2	-20.4	-15.9	-9.4	-0.8	+5.8	+11.7	+14.4	+18.2	+20.9	+22.0			
1300	744	-38.0	-34.9	-24.7	-21.5	-18.1	-10.7	-1.5	+6.3	+11.6	+14.0	+20.1	+23.6	+24.0		
1400	744	-29.0	-28.9	-21.5	-18.6	-16.1	-10.3	-2.3	+4.5	+10.0	+12.6	+15.7	+20.9	+22.0		
1500	744	-24.0	-21.9	-17.9	-15.6	-13.0	-9.4	-3.5	+1.5	+5.2	+7.5	+9.7	+12.9	+15.0		
1600	744	-17.0	-14.6	-13.1	-11.5	-8.7	-4.3	-0.3	+1.7	+3.2	+3.9	+6.9	+8.0			
1700	744	-14.0	-13.9	-13.0	-12.1	-11.1	-9.1	-5.5	-2.2	-0.2	+0.4	+1.3	+2.9	+4.0		
1800	744	-18.0	-17.9	-14.6	-13.6	-12.5	-10.6	-7.6	-4.7	-2.9	-1.7	-0.7	+0.4	+1.0		
1900	744	-21.0	-19.9	-16.5	-15.5	-14.4	-12.5	-9.8	-7.1	-5.3	-4.2	-3.3	-2.2	-2.0		
2000	744	-24.0	-20.5	-19.1	-17.9	-15.6	-12.2	-9.0	-6.5	-5.2	-3.8	-2.0	-1.0			
2100	744	-30.0	-26.9	-23.6	-21.9	-20.3	-17.9	-14.1	-10.5	-8.5	-7.2	-6.1	-4.0	-3.0		
2200	744	-31.0	-26.9	-25.1	-22.9	-21.6	-19.0	-15.4	-12.4	-10.8	-9.5	-8.4	-6.0	-4.0		
2300	744	-31.0	-28.9	-24.9	-23.8	-22.5	-20.2	-16.6	-13.3	-11.2	-10.3	-9.5	-8.0	-7.0		
2400	744	-29.0	-28.9	-25.9	-25.0	-23.9	-21.3	-17.7	-14.3	-12.2	-11.2	-10.1	-9.0	-8.0		
2500	744	-30.0	-29.9	-27.9	-26.6	-24.9	-22.3	-18.8	-14.5	-12.0	-11.1	-9.8	-7.5	-7.0		
2600	744	-34.0	-33.9	-28.9	-27.8	-26.3	-23.3	-19.3	-14.5	-12.0	-10.6	-9.8	-6.0	-4.0		
2700	744	-35.0	-32.9	-30.7	-29.1	-27.4	-24.1	-19.4	-14.2	-11.7	-10.2	-8.8	-6.0	-3.0		
2800	105	-30.2	-30.0	-29.5	-27.7	-25.0	-20.2	-15.4	-12.6	-10.7	-10.0	-9.4	-9.4	-9.5		
2900	104	-34.4	-31.0	-30.5	-28.9	-26.0	-21.4	-17.1	-13.4	-11.7	-11.0	-9.8	-9.8	-9.5		
3000	111	-38.5	-32.0	-31.5	-28.4	-26.1	-22.1	-16.0	-13.0	-13.1	-12.4	-12.1	-11.3	-11.2		
3100	112	-36.3	-33.0	-31.7	-29.4	-26.3	-22.4	-16.6	-13.0	-12.0	-12.0	-12.1	-11.3	-11.2		
3200	113	-35.3	-32.4	-31.5	-27.3	-24.3	-20.0	-17.4	-15.3	-13.4	-12.1	-10.4	-10.2	-10.2		
3300	117	-34.0	-34.0	-32.1	-28.3	-24.3	-20.3	-14.3	-12.0	-10.7	-13.2	-13.2	-13.2	-13.2		
3400	121	-36.8	-35.4	-34.2	-31.0	-27.0	-23.0	-17.0	-14.3	-13.0	-13.4	-13.4	-13.4	-13.4		
3500	122	-40.6	-39.8	-37.2	-35.4	-33.1	-25.4	-19.0	-17.3	-15.8	-14.2	-13.1	-12.9	-12.9		
3600	122	-42.0	-37.4	-36.4	-34.7	-33.1	-27.7	-21.2	-18.7	-15.4	-13.4	-12.4	-12.4	-12.4		
3700	122	-44.9	-38.0	-38.1	-36.0	-33.4	-24.0	-21.3	-20.4	-17.0	-17.1	-15.4	-15.4	-15.4		
3800	124	-44.3	-42.4	-41.2	-38.4	-35.7	-30.4	-24.5	-18.1	-15.0	-14.2	-14.2	-14.2	-14.2		
3900	125	-42.1	-41.7	-40.4	-37.5	-34.2	-26.4	-21.2	-17.0	-17.1	-17.1	-17.1	-17.1	-17.1		
4000	125	-44.3	-42.2	-41.3	-38.1	-35.4	-30.4	-24.4	-18.1	-15.0	-14.2	-14.2	-14.2	-14.2		
4100	125	-46.6	-46.5	-45.4	-44.0	-41.5	-34.0	-28.4	-24.4	-20.4	-19.2	-16.0	-15.4	-15.4		
4200	124	-49.5	-47.4	-47.2	-45.4	-42.4	-34.0	-28.4	-24.4	-20.4	-19.2	-16.0	-15.4	-15.4		
4300	124	-56.9	-52.0	-52.1	-50.4	-45.4	-39.4	-34.4	-29.4	-24.4	-20.4	-19.2	-16.0	-15.4		
4400	122	-54.2	-55.4	-54.4	-52.0	-48.4	-40.4	-34.4	-29.4	-24.4	-20.4	-19.2	-16.0	-15.4		
4500	121	-65.4	-58.4	-57.4	-55.0	-51.0	-44.4	-38.4	-33.4	-28.4	-25.4	-23.0	-23.0	-23.0		
4600	119	-62.9	-60.4	-57.4	-54.0	-50.2	-47.3	-39.1	-33.4	-30.7	-23.2	-21.1	-20.9	-20.9		
4700	118	-64.5	-61.0	-57.0	-54.0	-50.2	-44.0	-38.7	-33.4	-29.0	-22.1	-21.0	-20.4	-20.4		
4800	117	-62.6	-62.5	-61.7	-60.5	-57.1	-48.3	-41.0	-35.4	-32.7	-21.2	-21.2	-21.4	-21.4		
4900	115	-66.1	-65.4	-61.7	-60.6	-57.4	-48.7	-43.5	-39.1	-34.4	-26.1	-22.4	-22.4	-22.4		
5000	113	-64.2	-64.0	-63.7	-62.4	-57.4	-50.0	-42.6	-34.2	-31.4	-27.1	-25.4	-25.4	-25.4		
5100	110	-66.9	-66.7	-65.4	-64.0	-59.4	-51.0	-40.4	-36.2	-32.0	-26.1	-24.1	-23.0	-23.0		
5200	104	-69.6	-69.4	-68.3	-66.3	-60.4	-51.2	-39.1	-25.4	-21.4	-22.4	-21.4	-21.4	-21.4		
5300	103	-70.3	-70.0	-69.4	-67.4	-60.0	-50.4	-39.4	-27.0	-21.4	-21.4	-21.4	-21.4	-21.4		
5400	97	-73.4	-69.4	-67.4	-65.4	-61.0	-50.2	-36.4	-24.4	-19.4	-10.2	-9.4	-9.4	-9.4		
5500	89	-74.8	-68.1	-63.7	-60.3	-51.0	-35.2	-21.1	-7.0	-6.0	-6.0	-6.0	-6.0	-6.0		
5600	84	-72.4	-69.2	-66.6	-64.0	-59.4	-51.1	-35.1	-16.4	-11.0	-4.4	-4.4	-4.4	-4.4		
5700	77	-70.1	-69.7	-68.7	-68.4	-64.0	-47.0	-33.7	-23.1	-18.4	-8.4	-8.4	-8.4	-8.4		
5800	66	-71.8	-70.9	-70.4	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4	-7.4	-7.4		
5900	56	-71.2	-70.9	-70.4	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4	-7.4	-7.4		
6000	41	-75.7	-74.0	-72.0	-70.4	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4	-7.4		
6100	25	-81.6	-75.0	-74.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4	-7.4		
6200	18	-87.5	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6300	11	-82.7	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6400	9	-81.8	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6500	4	-87.5	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6600	5	-80.1	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6700	4	-100.0	-77.4	-77.4	-75.0	-72.0	-68.1	-64.0	-48.0	-30.9	-14.4	-12.4	-7.4	-7.4		
6800	5	-54.2	-51.5	-49.4	-47.4	-45.0	-40.4	-34.4	-29.4	-24.4	-20.4	-19.2	-16.0	-15.4		
6900	5	-44.7	-27.5	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4		
7000	5	-40.8	-29.5	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4		

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12:8

DATA SOURCE											AUGUST					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-9.0		-8.9	-5.4	-4.7	-4.0	-2.6	-0.7	-0.1	-1.7	-2.9	-3.7	-5.6	-6.0	
1.0	744	-20.0		-15.9	-9.1	-7.2	-6.3	-4.4	-0.7	-0.7	-5.8	-7.7	-9.2	-10.4	-11.0	
2.0	744	-22.0		-16.9	-7.9	-6.8	-5.7	-3.6	-0.3	-0.3	-5.7	-6.4	-8.8	-11.9	-14.0	
3.0	744	-24.0		-14.9	-8.3	-6.9	-5.9	-3.8	-0.2	-0.7	-6.4	-7.8	-9.2	-11.9	-14.0	
4.0	744	-23.0		-14.9	-8.9	-7.6	-5.9	-3.7	-0.1	-0.8	-6.8	-7.9	-9.2	-12.9	-16.0	
5.0	744	-22.0		-17.9	-9.7	-7.6	-6.2	-3.8	-0.2	-0.3	-7.2	-8.7	-10.1	-13.9	-17.0	
6.0	744	-18.0		-14.9	-9.6	-7.7	-6.4	-4.1	-0.3	-0.3	-7.5	-8.8	-11.7	-14.9	-17.0	
7.0	744	-14.0		-13.9	-10.4	-8.6	-6.8	-4.4	-0.4	-0.8	-6.8	-8.6	-10.8	-14.9	-22.0	
8.0	744	-15.0		-14.9	-10.9	-9.5	-7.5	-4.6	-0.5	-0.7	-6.9	-9.2	-11.9	-16.9	-22.0	
9.0	744	-15.0		-12.3	-10.4	-9.7	-8.7	-5.3	-0.5	-0.4	-7.1	-9.4	-12.1	-16.9	-18.0	
10.0	744	-18.0		-14.5	-12.5	-9.9	-8.9	-5.9	-0.3	-0.3	-4.8	-7.9	-11.8	-13.5	-15.9	
11.0	744	-23.0		-19.9	-17.6	-14.8	-11.9	-7.3	-0.3	-0.3	-5.4	-9.2	-11.8	-14.7	-20.0	
12.0	744	-25.0		-23.9	-18.7	-16.7	-14.3	-8.5	-0.0	-0.0	-6.0	-10.7	-12.7	-14.9	-20.0	
13.0	744	-22.0		-21.9	-18.8	-17.0	-14.2	-8.8	-0.0	-0.0	-6.7	-10.6	-14.0	-16.7	-21.0	
14.0	744	-23.0		-21.9	-18.0	-16.0	-13.0	-7.9	-0.4	-0.4	-5.4	-9.6	-12.2	-13.6	-16.4	
15.0	744	-24.0		-22.9	-15.2	-12.9	-10.8	-7.4	-1.6	-2.9	-6.1	-7.8	-10.1	-13.4	-14.0	
16.0	744	-18.0		-17.9	-12.3	-11.0	-9.3	-7.3	-3.2	-0.0	-2.9	-4.8	-5.7	-7.9	-9.0	
17.0	744	-17.0		-14.9	-13.3	-11.8	-10.6	-8.6	-5.2	-1.5	-0.1	-0.7	-1.6	-3.9	-5.0	
18.0	744	-17.0		-15.9	-13.8	-13.0	-11.9	-10.4	-7.4	-4.2	-1.9	-1.2	-0.6	-0.4	-1.0	
19.0	744	-21.0		-19.9	-16.9	-14.9	-14.9	-12.8	-9.7	-6.8	-4.5	-3.5	-3.0	-2.1	-2.0	
20.0	744	-28.0		-22.9	-20.7	-19.5	-18.0	-15.6	-12.1	-8.8	-6.6	-5.9	-4.8	-3.0	-2.0	
21.0	744	-34.0		-23.9	-22.1	-20.8	-19.8	-17.5	-14.0	-10.6	-8.6	-7.6	-6.5	-5.0	-4.0	
22.0	744	-36.0		-24.9	-23.5	-22.1	-21.1	-19.0	-15.4	-12.2	-10.4	-9.4	-8.5	-5.0	-4.0	
23.0	744	-38.0		-26.9	-24.5	-23.4	-22.0	-19.9	-16.3	-13.3	-11.4	-10.1	-9.0	-6.0	-3.0	
24.0	744	-38.0		-27.9	-24.9	-23.5	-22.5	-20.9	-17.4	-13.9	-11.9	-10.5	-9.2	-8.0	-5.0	
25.0	744	-38.0		-30.9	-27.9	-26.7	-25.2	-21.8	-18.1	-14.4	-12.3	-11.2	-10.0	-9.1	-9.0	
26.0	744	-33.0		-31.9	-30.1	-27.8	-25.8	-22.6	-18.5	-14.6	-12.0	-10.9	-9.3	-6.0	-0.0	
27.0	744	-41.0		-36.9	-30.5	-28.3	-26.6	-23.7	-19.2	-14.8	-12.5	-11.1	-9.8	-8.0	-7.0	
28.0	110	-27.9			-27.0	-24.7	-22.4	-20.4	-16.5	-13.2	-11.2	-10.4	-9.8	-8.3	-8.2	
29.0	113	-30.3			-29.7	-27.7	-25.0	-21.2	-17.4	-14.2	-12.4	-11.4	-10.4	-9.4	-11.1	
30.0	113	-33.4		-32.0	-30.7	-28.7	-26.0	-21.6	-17.2	-15.1	-12.0	-12.0	-12.4	-12.1	-12.0	
31.0	115	-34.1		-33.4	-32.7	-30.2	-27.6	-22.1	-17.0	-15.0	-12.0	-13.1	-12.0	-11.4	-11.4	
32.0	115	-39.5		-33.4	-32.4	-30.1	-27.7	-22.1	-17.4	-14.6	-12.4	-13.4	-12.4	-11.4	-11.7	
33.0	115	-39.1			-33.4	-30.7	-27.5	-22.7	-17.6	-14.9	-12.4	-12.1	-11.2	-10.2	-10.1	
34.0	117	-39.0		-34.4	-33.7	-32.1	-28.7	-24.7	-19.9	-16.9	-14.0	-12.0	-11.2	-10.2	-10.1	
35.0	114	-34.4		-35.0	-35.4	-32.4	-30.4	-25.5	-20.9	-17.9	-15.0	-12.0	-11.2	-10.2	-10.1	
36.0	114	-37.9				-34.7	-30.4	-26.7	-18.3	-13.0	-11.7	-10.7	-9.7	-8.0	-7.0	
37.0	120	-34.4				-37.4	-35.7	-31.2	-25.7	-18.2	-13.0	-11.0	-10.4	-9.4	-8.1	
38.0	120	-41.0		-40.4	-38.4	-37.4	-33.4	-28.4	-24.4	-18.4	-13.4	-11.4	-10.4	-9.4	-8.1	
39.0	120	-43.6		-43.5	-40.6	-40.0	-33.3	-26.0	-19.0	-12.0	-9.5	-7.7	-4.7	-4.3	-4.2	
40.0	119	-50.0		-44.0	-42.1	-42.0	-35.1	-26.4	-19.4	-13.0	-11.7	-10.7	-9.7	-7.3	-7.2	
41.0	117	-55.8		-45.6	-42.4	-41.1	-35.6	-29.1	-20.4	-15.4	-11.7	-9.2	-8.4	-8.3		
42.0	117	-46.4		-45.4	-43.4	-41.7	-36.4	-29.6	-21.4	-16.0	-12.4	-9.4	-8.4	-8.3		
43.0	117	-44.9		-44.4	-42.7	-40.1	-34.9	-28.4	-20.4	-15.4	-11.7	-9.4	-8.4	-8.3		
44.0	115	-55.2		-50.9	-49.7	-48.4	-40.0	-34.4	-28.4	-22.4	-17.4	-13.4	-10.4	-10.2		
45.0	114	-62.2		-57.0	-55.7	-51.4	-45.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
46.0	113	-61.7		-59.0	-55.4	-54.1	-45.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
47.0	110	-61.1		-60.0	-56.5	-54.5	-45.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
48.0	110	-59.2		-57.0	-56.5	-51.5	-45.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
49.0	104	-55.6		-55.0	-54.4	-53.2	-46.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
50.0	105	-60.5		-55.4	-55.2	-54.4	-46.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
51.0	105	-61.9		-60.0	-59.4	-56.7	-46.4	-39.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4		
52.0	9A	-69.6		-58.4	-53.4	-48.1	-40.4	-33.4	-27.4	-21.4	-17.4	-14.4	-11.4	-11.4		
53.0	9A	-61.2		-54.0	-51.1	-45.0	-37.4	-32.4	-27.4	-21.4	-17.4	-14.4	-11.4	-11.4		
54.0	91	-78.1		-54.0	-51.4	-47.1	-31.4	-25.7	-20.4	-15.7	-12.4	-10.4	-9.4	-9.4		
55.0	83	-64.7		-59.1	-49.9	-43.7	-31.4	-25.7	-20.4	-15.7	-12.4	-10.4	-9.4	-9.4		
56.0	75	-67.5		-61.4	-56.2	-40.1	-26.0	-20.4	-15.7	-12.4	-10.4	-9.4	-9.4	-9.4		
57.0	61	-64.7		-61.4	-56.2	-40.1	-26.0	-20.4	-15.7	-12.4	-10.4	-9.4	-9.4	-9.4		
58.0	48	-61.6		-60.4	-56.6	-40.4	-26.6	-20.6	-15.6	-12.6	-10.6	-9.6	-9.6	-9.6		
59.0	37	-64.6		-61.1	-56.6	-40.4	-26.6	-20.6	-15.6	-12.6	-10.6	-9.6	-9.6	-9.6		
60.0	27	-67.8		-61.1	-56.6	-40.4	-26.6	-20.6	-15.6	-12.6	-10.6	-9.6	-9.6	-9.6		
61.0	27	-79.4		-61.1	-56.6	-40.4	-26.6	-20.6	-15.6	-12.6	-10.6	-9.6	-9.6	-9.6		
62.0	19	-50.3		-56.6	-41.7	-37.7	-31.7	-25.7	-20.7	-15.7	-12.7	-10.7	-9.7	-9.7		
63.0	16	-64.4		-56.6	-41.7	-37.7	-31.7	-25.7	-20.7	-15.7	-12.7	-10.7	-9.7	-9.7		
64.0	10	-37.1		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
65.0	8	-39.2		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
66.0	7	-50.9		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
67.0	6	-51.4		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
68.0	5	-34.7		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
69.0	4	-21.7		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		
70.0	4	-21.9		-40.0	-30.2	-20.2	-14.0	-10.0	-7.0	-4.0	-3.0	-2.0	-2.0	-2.0		

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.9

DATA SOURCE											SEPTEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	-12.0			-7.5	-6.5	-5.0	-3.9	-1.4	+0.1	+1.6	+2.5	+5.4	+10.5	+11.0	
10	720	-30.0			-14.9	-11.3	-9.7	-6.0	-2.4	+1.5	+6.1	+8.6	+12.9	+26.0	+27.0	
20	720	-30.0			-15.8	-10.8	-9.0	-5.6	-0.9	+3.2	+7.8	+9.5	+14.6	+24.5	+25.0	
30	720	-24.0			-13.7	-9.5	-8.0	-4.8	-0.5	+4.1	+8.4	+11.5	+14.2	+27.0	+28.0	
40	720	-24.0			-11.7	-9.1	-7.2	-4.4	-0.3	+4.7	+9.1	+11.3	+13.4	+28.0	+29.0	
50	720	-25.0			-11.8	-8.5	-7.3	-4.3	-0.1	+5.1	+9.5	+11.8	+13.9	+26.0	+27.0	
60	720	-24.0			-12.3	-9.1	-7.7	-4.3	-0.0	+5.7	+9.6	+11.9	+13.7	+19.0	+20.0	
70	720	-26.0			-13.7	-10.7	-7.8	-4.3	+0.5	+6.2	+10.2	+13.1	+16.2	+18.0	+19.0	
80	720	-26.0			-14.9	-11.2	-8.2	-3.8	+1.0	+7.2	+11.6	+13.4	+15.9	+20.0	+21.0	
90	720	-22.0			-14.3	-9.9	-8.4	-3.8	+1.6	+8.5	+13.6	+16.6	+18.7	+24.0	+25.0	
100	720	-21.0			-15.7	-11.7	-8.3	-3.6	+3.0	+10.3	+15.3	+20.1	+23.4	+28.0	+29.0	
110	720	-25.0			-16.2	-11.7	-9.5	-3.7	+4.1	+11.8	+18.6	+21.9	+24.6	+33.0	+34.0	
120	720	-25.0			-15.8	-12.9	-8.8	-3.6	+5.1	+13.5	+20.8	+24.3	+27.7	+36.0	+37.0	
130	720	-24.0			-17.2	-13.1	-9.2	-3.4	+5.1	+15.4	+22.1	+26.5	+29.2	+33.5	+34.0	
140	720	-29.0			-16.5	-12.6	-10.0	-3.9	+4.6	+14.0	+19.4	+22.3	+24.5	+32.0	+33.0	
150	720	-25.0			-15.9	-13.8	-10.3	-4.9	+2.4	+10.1	+14.6	+16.6	+18.4	+21.0	+22.0	
160	720	-19.0			-13.9	-12.2	-10.0	-5.6	+0.0	+5.3	+9.8	+11.9	+13.6	+15.4	+16.0	
170	720	-17.0			-13.5	-11.9	-9.9	-6.5	-1.7	+2.6	+6.2	+8.5	+9.6	+11.0	+12.0	
180	720	-17.0			-13.9	-11.9	-10.0	-7.6	-3.4	-0.1	+2.7	+4.0	+5.7	+9.0	+10.0	
190	720	-16.0			-13.9	-13.2	-11.8	-9.4	-5.7	-2.0	-0.0	+1.4	+2.4	+5.5	+6.0	
200	720	-22.0			-16.2	-15.5	-14.2	-11.4	-7.4	-3.8	-1.2	-0.3	+0.1	+1.5	+2.0	
210	720	-21.0			-17.7	-16.5	-15.0	-12.7	-9.1	-5.7	-3.4	-2.3	-1.3	+1.0	+2.0	
220	720	-20.0			-19.5	-17.7	-16.0	-13.8	-10.2	-7.0	-4.6	-3.3	-2.3	-0.9	+0.0	
230	720	-23.0			-19.8	-18.6	-17.0	-14.8	-11.2	-7.5	-5.4	-4.1	-2.5	-0.2	+0.0	
240	720	-26.0			-21.1	-18.9	-17.7	-15.3	-11.6	-8.1	-5.8	-4.0	-2.4	-0.4	+0.0	
250	720	-24.0			-21.8	-20.9	-19.4	-16.2	-12.1	-8.2	-5.6	-4.2	-3.1	-2.0	+3.0	
260	720	-27.0			-23.3	-21.7	-20.2	-16.9	-12.2	-7.8	-5.3	-3.9	-2.8	-0.4	+0.0	
270	720	-32.0			-24.1	-22.9	-21.0	-17.3	-12.1	-7.4	-4.4	-3.1	-1.6	+3.0	+4.0	
280	106	-21.5			-21.5	-19.9	-18.0	-15.7	-12.0	-7.9	-4.4	-3.2	-2.1	-0.7	-0.5	
290	107	-26.7			-25.0	-24.4	-20.3	-17.5	-12.7	-8.1	-4.4	-3.8	-3.0	-0.4	-0.3	
300	108	-24.7			-24.7	-23.5	-20.5	-16.8	-11.7	-7.3	-3.3	-0.8	0.0	1.5	1.5	
310	109	-27.7			-24.0	-23.5	-19.0	-17.0	-11.9	-7.0	-3.2	-0.2	4.0	5.7	5.8	
320	104	-24.6			-23.0	-22.3	-20.4	-17.6	-12.1	-6.0	-1.4	-0.5	4.5	5.0	5.1	
330	109	-22.4			-21.0	-21.1	-16.2	-15.2	-11.1	-5.7	-0.7	3.5	4.5	5.0	5.0	
340	109	-22.6			-22.4	-22.4	-22.1	-16.4	-10.3	-3.4	2.6	5.4	6.0	8.4	8.7	
350	108	-27.3			-26.0	-23.8	-21.6	-16.4	-9.3	-2.4	4.2	5.5	11.0	13.0	13.2	
360	104	-24.3			-24.0	-24.4	-22.6	-16.3	-9.4	-1.0	3.8	4.8	7.0	10.7	10.8	
370	107	-30.3			-29.0	-24.4	-20.3	-17.0	-10.1	-1.5	3.6	4.8	7.0	9.7	9.9	
380	106	-25.9			-24.0	-22.8	-21.3	-18.0	-10.3	-2.6	3.4	4.8	7.7	9.4	9.5	
390	104	-23.8			-23.8	-23.3	-21.9	-18.5	-10.7	-3.1	4.7	8.2	9.7	9.1	9.1	
400	106	-29.2			-26.0	-25.0	-24.8	-18.7	-9.4	-3.6	4.2	5.4	6.5	6.0	7.0	
410	107	-35.5			-32.0	-29.7	-26.8	-19.6	-9.5	-1.8	1.3	4.7	7.0	9.8	9.9	
420	107	-31.6			-34.0	-32.7	-29.9	-18.9	-7.4	-1.6	3.5	4.4	5.0	5.7	5.9	
430	100	-38.5			-38.0	-36.7	-32.0	-28.0	-10.0	-2.1	2.0	5.7	6.7	7.3	7.4	
440	99	-40.2			-36.4	-34.1	-21.8	-9.4	-1.2	2.7	8.2	5.0	5.8	5.6	5.7	
450	95	-43.2			-33.8	-27.2	-20.0	-7.0	0.0	3.4	4.0	9.1	9.4	9.0	10.0	
460	94	-33.9			-27.9	-26.1	-17.5	-7.4	-1.5	3.4	7.0	18.1	19.1	19.2	19.2	
470	86	-20.8			-26.7	-26.7	-18.4	-9.7	0.4	7.7	10.0	13.2	14.1	14.2	14.2	
480	84	-20.0			-28.1	-25.7	-18.8	-8.6	2.2	5.0	9.0	9.6	10.0	10.0	10.0	
490	83	-29.5			-27.1	-24.6	-19.4	-7.7	2.3	6.4	9.1	10.2	11.1	11.2	11.2	
500	81	-30.8			-27.2	-25.0	-17.6	-6.7	4.7	8.7	9.4	14.1	14.5	14.5	14.5	
510	76	-32.9			-31.3	-26.2	-20.0	-6.0	4.6	13.1	13.8	20.2	20.7	20.8	20.8	
520	66	-39.4			-30.9	-27.7	-21.8	-8.7	4.2	7.7	12.5	26.8	26.8	26.8	26.8	
530	61	-33.4			-32.6	-28.0	-19.7	-3.2	5.3	11.0	18.4	26.4	27.0	27.1	27.1	
540	58	-30.9			-30.7	-25.1	-17.0	-1.5	9.8	16.4	20.7	21.4	22.4	22.5	22.5	
550	55	-30.5			-23.7	-22.6	-13.3	-0.6	12.3	17.3	19.7	24.6	25.2	25.3	25.3	
560	46	-25.6			-24.0	-21.7	-11.0	0.0	9.6	17.4	18.0	22.5	22.9	23.0	23.0	
570	37	-26.3			-19.1	-12.1	-12.1	-0.7	11.6	21.2	27.1	27.3	27.5	27.6	27.6	
580	31	-21.8			-20.4	-12.1	-12.1	7.5	17.1	29.5	35.7	35.7	36.0	36.0	36.0	
590	20	-21.9			-10.8	-10.8	-10.8	8.5	14.0	25.0	25.7	26.0	26.2	26.2	26.2	
600	12	-15.8			-12.1	-12.1	-12.1	3.0	32.0	32.6	32.6	32.7	32.7	32.7	32.7	
610	4	-15.4			-8.7	-8.7	-8.7	2.0	32.7	32.7	32.7	32.7	32.7	32.7	32.7	
620	4	-22.4						-11.0	67.1	67.8	68.0	68.1	68.1	68.1	68.1	
630	4	-19.5						-17.0	91.1	92.0	92.4	92.4	92.4	92.5	92.5	
640	2	-17.1						-17.0	3.0	4.1	4.2	4.2	4.2	4.2	4.2	
650	1	40.1													40.1	
660	1	51.5													51.5	
670	1	34.9													34.9	
680	1	24.7													24.7	
690	1	14.0													14.0	
700	1	1.9													1.9	

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.10

DATA SOURCE										OCTOBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)								
				LATITUDE	LONGITUDE										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956									
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967									
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967									
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA															
ALT. (KM)	NUM DBS	MIN SPEED (DEG)	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE 15.900	PERCENTAGE 50.000	FREQUENCY 84.100	95.000	97.720	99.000	99.885	MAX DIR SPEED (DEG)
5FC 744	-12.0	-10.9	-8.7	-7.2	-5.4	-3.6	-0.6	+1.3	+3.2	+4.4	+5.7	+6.9	+9.0		
1.0 744	-17.0	-16.9	-13.5	-12.0	-10.1	-6.3	-1.4	+3.3	+6.6	+8.8	+11.2	+17.9	+21.0		
2.0 744	-15.0		-12.3	-10.2	-7.8	-4.5	-0.0	+5.3	+9.2	+12.0	+14.5	+18.7	+19.0		
3.0 744	-18.0	-13.9	-11.1	-9.1	-5.9	-2.8	+1.2	+6.7	+11.8	+13.8	+18.5	+22.9	+25.0		
4.0 744	-13.0		-9.5	-7.6	-5.0	-1.8	+2.7	+8.7	+13.9	+16.6	+20.5	+26.9	+30.0		
5.0 744	-12.0	-9.9	-7.2	-5.6	-3.7	-0.9	+4.4	+10.6	+16.3	+18.8	+22.5	+30.4	+31.0		
6.0 744	-9.0	-8.9	-6.4	-4.8	-2.7	-0.2	+5.9	+12.9	+19.7	+22.4	+24.8	+32.9	+40.0		
7.0 744	-11.0	-9.9	-5.9	-4.5	-2.6	+0.2	+7.9	+15.2	+23.1	+27.0	+30.6	+40.9	+50.0		
8.0 744	-7.0		-5.7	-3.5	-1.8	+1.1	+9.9	+18.6	+26.9	+31.6	+33.8	+47.9	+54.0		
9.0 744	-7.0	-6.9	-5.2	-3.6	-2.0	+2.1	+12.3	+22.6	+31.2	+36.7	+42.5	+50.9	+67.0		
10.0 744	-15.0	-10.9	-7.6	-5.2	-1.4	+3.0	+14.0	+26.7	+35.3	+40.5	+45.7	+53.9	+65.0		
11.0 744	-17.0	-16.9	-7.5	-4.7	-1.4	+3.8	+16.4	+30.5	+39.1	+44.0	+47.8	+59.9	+68.0		
12.0 744	-21.0	-14.9	-7.2	-4.2	+0.8	+5.3	+18.7	+31.9	+39.9	+43.8	+51.1	+64.9	+66.0		
13.0 744	-13.0	-11.9	-7.5	-3.5	+0.6	+6.4	+18.5	+31.5	+39.9	+45.0	+49.5	+57.9	+60.0		
14.0 744	-10.0	-9.9	-5.1	-2.5	+0.4	+5.4	+17.8	+27.8	+36.1	+41.0	+47.5	+57.9	+64.0		
15.0 744	-7.0		-5.5	-3.0	+0.2	+4.2	+14.1	+23.3	+29.9	+34.5	+39.5	+48.9	+59.0		
16.0 744	-8.0	-7.9	-5.8	-2.7	+0.8	+2.5	+9.6	+17.8	+22.9	+26.6	+28.8	+39.9	+41.0		
17.0 744	-9.0	-8.9	-6.5	-5.2	+2.8	-0.3	+5.0	+11.9	+17.8	+20.5	+23.5	+29.9	+32.0		
18.0 744	-8.0		-7.2	-6.0	-4.4	-1.9	+1.3	+6.6	+11.4	+14.5	+19.2	+25.9	+31.0		
19.0 744	-12.0	-11.9	-8.9	-7.5	-6.4	-3.9	+0.6	+3.2	+7.4	+10.5	+12.3	+19.9	+25.0		
20.0 744	-11.0		-9.9	-8.6	-7.6	-5.8	-1.9	+1.2	+4.6	+6.8	+10.3	+16.9	+18.0		
21.0 744	-12.0		-10.3	-9.5	-8.4	-6.5	-2.7	+0.3	+3.8	+5.6	+8.8	+11.9	+16.0		
22.0 744	-14.0	-13.9	-11.8	-10.5	-9.4	-7.1	-3.1	+0.1	+2.9	+4.7	+6.5	+10.9	+12.0		
23.0 744	-14.0		-12.5	-11.6	-10.2	-7.6	-3.9	+0.0	+2.9	+5.0	+7.1	+9.9	+13.0		
24.0 744	-15.0		-13.2	-11.7	-10.6	-8.1	-3.7	+0.1	+3.5	+6.1	+7.6	+9.9	+12.0		
25.0 744	-15.0	-14.9	-12.7	-12.0	-10.9	-7.9	-3.2	+0.5	+4.7	+7.5	+8.7	+10.9	+14.0		
26.0 744	-15.0		-12.7	-12.6	-10.7	-7.7	-2.4	+2.0	+6.0	+8.7	+10.7	+14.9	+16.0		
27.0 744	-18.0	-14.9	-14.1	-12.7	-11.1	-8.8	-1.9	+3.5	+7.9	+10.5	+11.9	+15.4	+16.0		
28.0 74	-14.2		-15.2	-11.7	-7.6	-1.2	+5.4	+4.4	+9.4	+9.4	+9.4	+9.7	+9.7		
29.0 82	-14.7		-14.1	-9.9	-7.0	-1.0	+6.0	+5.0	+9.0	+10.1	+12.9	+15.0	+15.2		
30.0 84	-14.3		-10.5	-8.0	-6.4	-1.5	+7.0	+10.0	+15.1	+15.1	+16.2	+17.0	+17.2		
31.0 85	-16.4		-14.1	-10.7	-5.5	-1.5	+9.5	+15.4	+14.1	+14.1	+19.2	+20.0	+20.1		
32.0 90	-14.2		-13.0	-9.2	-4.7	-3.4	+12.7	+17.5	+21.0	+21.0	+23.1	+23.0	+24.1		
33.0 90	-12.7		-9.0	-6.2	-3.7	-5.7	+16.2	+20.4	+22.0	+26.4	+26.4	+26.4	+26.4		
34.0 90	-7.9		-6.4	-6.4	-1.7	-7.4	+20.3	+24.4	+27.0	+29.1	+29.1	+29.1	+30.0		
35.0 90	-10.9		-8.0	-6.5	-2.4	-11.0	+21.7	+30.5	+32.0	+34.7	+34.7	+35.3	+35.3		
36.0 91	-10.0		-11.0	-8.2	-2.9	-12.5	+27.0	+33.4	+35.0	+38.1	+38.1	+38.4	+38.4		
37.0 90	-15.8		-9.5	-8.3	-1.9	-13.4	+25.0	+32.5	+35.0	+39.4	+39.4	+39.4	+39.4		
38.0 84	-14.1		-11.4	-8.6	-1.0	-13.4	+32.2	+37.4	+41.0	+43.1	+43.1	+43.1	+43.1		
39.0 94	-11.6		-10.4	-6.6	-0.5	-15.7	+31.5	+41.3	+44.0	+47.1	+47.1	+47.1	+47.1		
40.0 95	-13.6		-10.0	-7.3	0.4	-16.7	+35.1	+47.3	+44.0	+50.0	+50.0	+50.0	+50.7		
41.0 94	-14.9		-8.0	-6.6	1.4	-19.5	+37.6	+51.1	+52.4	+57.0	+57.0	+57.4	+57.7		
42.0 97	-14.6		-10.4	-4.1	1.4	-21.5	+39.4	+51.2	+54.0	+59.0	+59.0	+59.6	+59.7		
43.0 97	-14.1		-12.0	-5.3	3.0	-22.5	+30.1	+52.3	+53.4	+55.1	+55.1	+55.0	+55.1		
44.0 94	-13.8		-8.0	-6.4	5.4	-23.0	+42.2	+51.2	+53.0	+54.1	+54.1	+54.0	+54.0		
45.0 92	-11.6		-9.0	-6.4	7.0	-24.3	+41.7	+53.4	+55.0	+61.0	+61.0	+61.0	+61.5		
46.0 93	-11.2		-9.0	-6.4	4.7	-26.5	+45.0	+59.5	+59.5	+69.0	+69.0	+69.0	+69.0		
47.0 91	-12.7		-5.0	0.4	4.1	-29.5	+47.0	+57.4	+59.0	+65.1	+65.1	+65.4	+65.7		
48.0 89	-4.1		-3.0	2.7	10.6	-30.4	+49.1	+60.7	+65.0	+72.2	+72.2	+72.2	+72.2		
49.0 86	-3.7		0.4	5.4	14.2	-33.0	+49.7	+64.4	+64.1	+74.2	+74.2	+74.2	+74.2		
50.0 79	0.2		3.4	4.0	13.4	-34.4	+49.4	+64.1	+72.4	+73.2	+73.2	+73.2	+73.2		
51.0 70	2.4		3.3	5.3	17.1	-40.0	+54.0	+66.5	+71.4	+74.4	+81.2	+81.4	+81.4		
52.0 75	0.9		2.7	3.5	13.9	-35.4	+51.1	+70.3	+74.4	+74.4	+74.4	+74.4	+74.4		
53.0 70	2.4		3.3	5.3	17.1	-40.0	+54.0	+66.5	+71.4	+74.4	+81.2	+81.4	+81.4		
54.0 63	4.5		4.7	6.1	16.0	-40.4	+54.0	+65.4	+69.4	+72.4	+72.4	+72.4	+72.4		
55.0 57	4.8		5.3	4.7	19.0	-42.4	+54.0	+65.4	+69.4	+71.4	+71.4	+71.7	+71.7		
56.0 48	4.9		5.1	7.4	17.5	-41.5	+54.0	+67.7	+69.4	+71.4	+71.4	+71.7	+71.7		
57.0 40	5.1		6.0	10.2	39.5	-61.7	+69.4	+71.4	+71.4	+71.4	+71.4	+71.4	+71.4		
58.0 34	3.1		4.4	13.4	40.0	-54.6	+64.1	+70.2	+70.2	+70.2	+70.2	+70.2	+70.2		
59.0 27	1.3		6.4	12.6	39.5	-60.7	+71.4	+71.4	+71.4	+71.4	+71.4	+71.4	+71.4		
60.0 22	-5.5		2.1	8.5	36.0	-62.5	+72.0	+74.4	+74.4	+74.4	+74.4	+74.4	+74.4		
61.0 14	-10.4				23.1	-47.0	+64.4	+77.4	+77.4	+77.4	+77.4	+77.4	+77.4		
62.0 8	2.4						-45.0	+70.4	+70.4	+70.4	+70.4	+70.4	+70.4		
63.0 2	38.8						-39.0	+84.4	+84.4	+84.4	+84.4	+84.4	+84.4		
64.0 1	34.0														
65.0 1	44.4														
66.0 1	24.2														
67.0 1	15.4														
68.0 1	4.6														
69.0 1	7.0														
70.0 1	19.2														

HEAD AND TAIL WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH

TABLE 12.11

DATA SOURCE										NOVEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE PERCENTAGE FREQUENCY	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	720	-9.0		-6.9	-5.6	-4.7	-2.7	-0.3	+1.9	+3.9	+5.6	+7.2	+10.0	+11.0		
1.0	720	-15.0		-11.3	-10.4	-9.3	-6.4	-0.8	+4.8	+10.2	+13.1	+16.9	+21.0	+22.0		
2.0	720	-13.0		-10.7	-8.9	-7.6	-4.3	-0.9	+7.7	+13.5	+17.3	+19.9	+28.0	+29.0		
3.0	720	-12.0		-8.9	-7.1	-5.0	-1.8	+3.2	+10.6	+17.0	+20.3	+22.9	+35.0	+36.0		
4.0	720	-11.0		-7.9	-5.9	-3.5	-0.3	+5.2	+13.2	+19.2	+22.7	+25.9	+34.0	+35.0		
5.0	720	-11.0		-7.4	-5.5	-2.1	+0.8	+7.9	+16.8	+22.6	+25.5	+28.9	+39.5	+40.0		
6.0	720	-12.0		-6.4	-4.1	-1.2	+2.9	+10.4	+20.1	+26.5	+29.6	+34.4	+49.0	+50.0		
7.0	720	-11.0		-5.8	-3.5	-0.1	+4.8	+13.5	+22.9	+29.7	+33.1	+36.5	+48.0	+49.0		
8.0	720	-13.0		-5.9	-2.4	+0.2	+7.6	+16.7	+26.1	+33.8	+37.8	+42.8	+54.0	+55.0		
9.0	720	-15.0		-4.9	-2.4	+1.0	+9.6	+19.8	+29.5	+37.0	+42.8	+47.4	+58.0	+59.0		
10.0	720	-17.0		-5.7	-1.4	+1.5	+11.1	+22.7	+33.2	+41.5	+45.7	+51.8	+73.0	+74.0		
11.0	720	-15.0		-3.7	+0.3	+3.6	+13.9	+25.7	+36.7	+44.4	+49.5	+53.9	+72.0	+73.0		
12.0	720	-12.0		-2.7	+0.6	+5.0	+15.1	+27.9	+38.8	+46.7	+50.8	+57.9	+77.0	+80.0		
13.0	720	-17.0		-2.2	+2.4	+7.0	+16.4	+28.1	+38.5	+46.2	+49.7	+54.9	+76.0	+77.0		
14.0	720	-11.0		-1.7	+2.1	+7.7	+15.4	+26.2	+35.7	+41.8	+46.7	+50.9	+65.0	+66.0		
15.0	720	-7.0		-2.2	+0.8	+5.5	+13.4	+22.5	+29.8	+36.2	+39.3	+41.4	+51.0	+52.0		
16.0	720	-7.0		-2.5	+0.4	+3.0	+9.6	+18.4	+24.7	+29.5	+31.9	+33.4	+44.0	+45.0		
17.0	720	-5.0		-2.9	-1.1	+1.0	+5.7	+13.0	+19.7	+24.3	+27.5	+28.8	+35.0	+36.0		
18.0	720	-9.0		-6.1	-3.9	-1.2	+2.1	+8.6	+14.2	+18.8	+20.8	+23.2	+27.0	+28.0		
19.0	720	-10.0		-7.2	-5.3	-2.6	-0.1	+4.9	+9.8	+14.0	+16.6	+18.4	+27.0	+28.0		
20.0	720	-9.0		-6.9	-4.1	-4.3	-1.0	+2.8	+7.2	+12.0	+13.9	+17.2	+24.0	+25.0		
21.0	720	-12.0		-7.5	-6.6	-4.8	-1.9	+1.8	+6.7	+11.1	+14.2	+16.7	+21.5	+22.0		
22.0	720	-11.0		-7.6	-6.4	-5.4	-2.4	+1.6	+7.0	+11.8	+14.8	+17.8	+24.0	+25.0		
23.0	720	-14.0		-8.6	-7.7	-6.2	-2.1	+2.5	+7.5	+12.4	+15.5	+19.2	+25.0	+26.0		
24.0	720	-20.0		-9.8	-8.7	-6.4	-1.8	+3.8	+9.0	+14.1	+16.5	+19.2	+22.0	+23.0		
25.0	720	-15.0		-9.9	-8.0	-6.2	-1.3	+5.4	+11.7	+15.7	+18.5	+20.6	+34.0	+35.0		
26.0	720	-19.0		-11.5	-9.4	-5.8	-0.7	+6.9	+13.6	+17.5	+19.9	+22.5	+33.0	+34.0		
27.0	720	-22.0		-15.7	-9.9	-6.5	-0.2	+9.1	+16.1	+20.1	+21.5	+23.7	+30.6	+31.0		
28.0	90	-19.6		-10.0	-4.3	1.1	10.2	17.0	22.4	24.4	24.4	24.4	29.4	29.4		
29.0	90	-17.2		-8.7	-5.5	1.4	13.3	21.0	26.4	29.4	29.4	29.4	29.4	29.4		
30.0	90	-15.0		-8.0	-6.7	3.3	15.3	24.2	30.4	33.0	33.0	33.0	34.0	34.0		
31.0	91	-12.9		-9.0	-8.5	6.4	16.5	26.3	33.1	33.7	34.4	34.4	34.4	34.4		
32.0	91	-9.1		-5.0	-1.5	9.5	20.5	30.2	39.7	40.0	40.0	40.0	40.0	40.0		
33.0	92	-16.4		-2.0	0.4	11.0	23.0	34.4	39.7	40.0	40.0	40.0	40.0	40.0		
34.0	92	-21.5		-3.0	3.6	14.3	26.0	36.2	41.4	43.0	43.0	43.0	43.0	43.0		
35.0	92	-25.0		-1.0	5.6	15.3	28.3	38.4	43.2	44.4	44.4	44.4	44.4	44.4		
36.0	90	-24.9		2.0	5.5	17.1	29.0	41.2	46.3	44.0	44.0	44.0	44.0	44.0		
37.0	91	-27.8		5.0	6.4	15.4	31.4	44.1	47.7	50.0	51.4	51.4	51.4	51.4		
38.0	96	-19.8		2.2	7.4	20.4	34.4	44.3	49.4	51.0	51.0	51.0	51.0	51.0		
39.0	90	-5.0		2.1	7.4	21.0	34.0	44.7	49.2	50.0	50.0	50.0	50.0	50.0		
40.0	93	-1.0		9.1	10.7	24.4	41.4	47.2	52.4	53.0	53.0	53.0	53.0	53.0		
41.0	93	2.7		13.1	15.7	26.2	42.1	44.4	54.2	54.0	54.0	54.0	54.0	54.0		
42.0	93	3.0		16.1	17.3	28.4	43.4	51.2	57.2	57.0	57.0	57.0	57.0	57.0		
43.0	92	4.0		18.1	19.3	29.0	44.4	55.3	59.4	59.0	59.0	59.0	59.0	59.0		
44.0	84	12.7		18.0	23.4	32.7	46.4	59.0	62.0	65.4	67.0	67.0	67.0	67.0		
45.0	87	11.2		15.0	25.4	34.4	51.1	63.4	67.4	72.0	72.0	72.0	72.0	72.0		
46.0	86	10.2		11.0	26.3	36.2	53.5	64.7	70.7	75.0	75.0	75.0	75.0	75.0		
47.0	83	7.3		11.0	28.6	39.1	58.3	64.0	76.2	79.1	81.1	81.1	81.1	81.1		
48.0	82	4.2		8.0	32.1	34.0	61.0	74.5	79.9	87.1	89.2	90.2	90.2	90.2		
49.0	85	7.4		12.0	28.3	41.2	61.4	75.4	85.4	89.4	89.7	90.2	90.2	90.2		
50.0	84	13.2		28.2	28.2	48.3	64.3	79.7	89.2	97.1	98.1	98.1	98.1	98.1		
51.0	77	12.9		13.4	20.9	51.1	64.3	81.0	91.2	98.2	103.2	103.2	103.2	103.2		
52.0	74	12.2		13.7	20.7	46.7	64.3	80.3	90.3	96.3	107.2	107.2	107.2	107.2		
53.0	70	9.5		13.4	20.4	47.6	65.0	83.0	92.5	97.4	104.2	104.2	104.2	104.2		
54.0	61	6.4		21.4	39.0	54.3	67.5	85.3	92.0	93.4	104.4	104.4	104.4	104.4		
55.0	52	6.6		23.2	37.6	49.3	64.5	80.0	94.2	94.0	97.4	97.4	97.4	97.4		
56.0	47	7.1		25.1	26.4	51.2	67.5	87.3	97.7	102.0	103.4	103.4	103.4	103.4		
57.0	45	10.7		12.0	25.3	50.1	70.5	87.0	101.4	104.4	110.3	110.3	110.3	110.3		
58.0	34	12.2			22.9	51.0	70.5	84.0	104.1	117.1	117.4	117.4	117.4	117.4		
59.0	29	26.5			30.5	51.6	71.4	83.4	93.4	96.4	96.4	96.4	96.4	96.4		
60.0	21	28.4			40.1	52.5	70.0	83.4	94.4	95.0	104.4	104.4	104.4	104.4		
61.0	16	31.2				55.7	71.4	83.4	94.4	95.0	104.4	104.4	104.4	104.4		
62.0	15	34.8				57.5	70.0	83.4	94.4	95.0	104.4	104.4	104.4	104.4		
63.0	11	34.6				61.4	67.5	84.5	111.3	111.4	112.0	112.0	112.0	112.0		
64.0	7	51.1				52.7	69.5	90.3	97.5	97.0	98.0	98.1	98.1	98.1		
65.0	6	40.8				58.1	71.5	76.0	134.3	134.0	134.5	134.5	134.5	134.5		
66.0	4	14.0					54.0	70.0	70.7	70.0	71.0	71.0	71.0	71.0		
67.0	4	24.8					53.0	67.4	67.0	64.0	64.1	64.1	64.1	64.1		
68.0	4	17.3					33.0	64.5	65.0	65.2	65.2	65.2	65.2	65.2		
69.0	3	-0.9					32.0	82.5	83.0	83.4	83.4	83.4	83.4	83.4		
70.0	2	-14.3					34.5	51.5	52.0	52.1	52.1	52.1	52.1	52.1		
							-14.0	63.0	64.0	64.0	64.0	64.0	64.0	64.0		

DATA SOURCE											DECEMBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 744	-9.0	-7.9	-6.1	-4.9	-4.1	-2.2		-0.0	+2.5	+4.8	+6.1	+7.3	+9.9	+11.0			
1.0 744	-21.0	-16.9	-11.9	-10.1	-8.3	-5.6		-0.2	+6.8	+11.4	+14.4	+17.7	+19.9	+22.0			
2.0 744	-17.0	-16.9	-9.1	-6.9	-5.5	-2.8		+2.5	+10.0	+15.3	+18.7	+22.5	+26.9	+32.0			
3.0 744	-8.0	-7.9	-5.7	-4.0	-2.9	-0.6	+6.0	+13.4	+18.8	+23.4	+26.3	+32.9	+34.0				
4.0 744	-8.0	-5.9	-4.0	-2.6	-0.8	+1.8	+8.7	+16.8	+23.4	+27.0	+31.2	+37.9	+39.0				
5.0 744	-13.0	-10.9	-4.1	-1.5	+0.0	+3.6	+11.6	+19.9	+26.7	+32.5	+36.8	+41.9	+44.0				
6.0 744	-7.0	-5.9	-2.7	-0.6	+1.3	+5.7	+14.6	+23.4	+30.4	+35.2	+41.7	+46.9	+50.0				
7.0 744	-11.0	-7.9	-1.8	-0.0	+2.4	+7.3	+9.0	+27.7	+35.4	+40.2	+45.1	+51.9	+57.0				
8.0 744	-12.0	-7.9	+0.9	+0.9	+3.8	+9.4	+20.7	+32.1	+39.3	+45.0	+48.5	+52.9	+54.0				
9.0 744	-13.0	-9.9	+0.5	+2.6	+4.4	+10.6	+23.2	+37.6	+44.8	+50.3	+54.2	+57.9	+61.0				
10.0 744	-14.0	-12.9	+0.2	+3.8	+5.9	+12.2	+24.8	+41.2	+51.6	+56.1	+60.7	+68.4	+69.0				
11.0 744	-10.0	-9.9	+0.8	+4.5	+7.4	+14.3	+29.2	+44.1	+54.1	+57.6	+63.7	+68.9	+76.0				
12.0 744	-5.0	-4.9	+2.4	+5.1	+9.4	+17.1	+31.3	+47.0	+56.9	+62.0	+65.2	+85.9	+89.0				
13.0 744	-2.0	+0.0	+6.0	+8.2	+12.0	+18.6	+32.3	+45.3	+53.9	+60.7	+64.7	+78.9	+81.0				
14.0 744	+0.0	+0.0	+6.7	+8.9	+12.2	+18.2	+30.7	+42.8	+50.6	+57.2	+63.1	+68.9	+76.0				
15.0 744	-2.0	-0.9	+4.6	+8.3	+11.5	+16.6	+27.7	+37.8	+46.4	+50.5	+55.7	+58.9	+68.0				
16.0 744	-2.0	-0.9	+2.7	+5.9	+9.5	+14.5	+23.5	+32.1	+38.1	+42.0	+50.2	+54.9	+59.0				
17.0 744	-5.0	-2.9	+0.1	+3.8	+6.3	+11.3	+18.9	+26.5	+31.1	+34.8	+39.7	+49.9	+52.0				
18.0 744	-16.0	-6.9	-1.1	-0.0	+3.0	+7.1	+13.9	+21.3	+24.8	+27.8	+30.8	+34.9	+38.0				
19.0 744	-6.0	-5.9	-3.5	-1.6	+0.2	+3.3	+8.6	+16.3	+21.3	+24.2	+26.3	+32.9	+35.0				
20.0 744	-6.0	-5.9	-3.9	-2.6	-0.9	+1.0	+5.8	+12.6	+18.7	+23.0	+26.7	+32.6	+33.0				
21.0 744	-7.0	-6.0	-6.0	-4.2	-2.3	-0.1	+5.3	+11.0	+16.5	+19.3	+25.2	+29.9	+32.0				
22.0 744	-11.0	-7.9	-8.1	-6.0	-2.9	+0.0	+5.4	+11.3	+15.6	+18.5	+21.1	+25.9	+27.0				
23.0 744	-11.0	-10.9	-7.7	-6.2	-3.8	+0.0	+6.3	+12.4	+17.7	+20.0	+23.8	+27.9	+35.0				
24.0 744	-11.0	-8.8	-6.5	-4.3	-1.2	+7.8	+14.9	+20.3	+23.4	+27.5	+32.9	+37.0					
25.0 744	-14.0	-13.9	-9.7	-7.5	-4.2	+2.4	+10.1	+17.7	+23.9	+26.6	+30.2	+35.9	+38.0				
26.0 744	-17.0	-16.9	-12.5	-8.6	-5.9	+2.5	+11.8	+19.5	+26.9	+29.5	+33.2	+35.9	+37.0				
27.0 744	-23.0	-19.9	-11.7	-7.3	-3.0	+13.6	+21.4	+27.3	+30.8	+32.5	+41.9	+43.0					
28.0 132	-25.4	-19.9	-16.0	-11.1	-13.2	-7.0	+15.0	+21.0	+26.0	+29.1	+31.0	+38.7	+44.1				
29.0 134	-25.5	-20.7	-18.0	-13.4	-8.6	+17.0	+25.4	+29.1	+31.0	+38.7	+44.1	+44.4					
30.0 139	-26.3	-19.6	-18.0	-17.0	-8.0	+19.3	+25.6	+34.4	+37.4	+41.6	+46.6	+46.9					
31.0 140	-29.0	-25.6	-22.4	-21.2	-7.4	+20.9	+24.0	+34.0	+42.4	+42.0	+46.1	+46.3					
32.0 141	-29.3	-27.4	-28.4	-25.0	-8.6	+22.1	+31.1	+40.0	+43.0	+44.6	+48.5	+48.7					
33.0 141	-36.7	-31.6	-28.4	-25.6	-9.6	+21.9	+36.6	+43.0	+49.4	+51.6	+57.4	+54.0					
34.0 141	-40.6	-40.6	-28.4	-24.3	-9.6	+23.1	+40.2	+46.3	+52.4	+54.6	+59.4	+60.1					
35.0 141	-42.2	-40.6	-28.4	-22.0	-11.4	+22.5	+44.2	+53.0	+56.0	+59.4	+62.4	+62.4					
36.0 141	-44.1	-44.1	-32.4	-23.0	-10.4	+21.4	+45.4	+54.7	+54.7	+54.7	+60.4	+64.9					
37.0 141	-50.8	-50.6	-30.6	-25.5	-10.6	+24.1	+44.6	+57.0	+64.0	+66.4	+70.4	+71.0					
38.0 141	-49.0	-43.6	-30.4	-27.0	-13.4	+25.4	+50.4	+63.0	+69.4	+70.4	+80.5	+80.6					
39.0 142	-44.5	-41.5	-39.0	-31.9	-16.2	+29.0	+49.9	+67.4	+73.4	+75.6	+79.6	+79.7					
40.0 142	-52.1	-40.6	-35.4	-33.5	-16.5	+32.0	+53.5	+66.0	+75.4	+74.4	+79.4	+79.4					
41.0 142	-54.6	-39.4	-35.4	-24.9	-14.5	+34.0	+56.5	+66.0	+75.4	+74.4	+79.4	+80.1					
42.0 140	-49.6	-41.6	-36.4	-32.3	-17.4	+32.4	+57.4	+66.0	+73.4	+74.4	+74.4	+78.5					
43.0 139	-57.5	-41.4	-37.4	-31.1	-13.0	+29.3	+56.0	+65.0	+72.4	+76.4	+81.7	+81.9					
44.0 140	-45.9	-42.6	-36.4	-29.5	-13.4	+29.0	+54.9	+65.0	+64.4	+75.4	+87.4	+84.0					
45.0 134	-51.5	-43.6	-36.0	-27.6	-10.4	+26.0	+61.4	+64.4	+72.4	+77.4	+90.1	+90.4					
46.0 137	-50.6	-47.4	-39.0	-29.1	-9.1	+27.5	+67.5	+73.7	+76.4	+79.4	+90.4	+91.0					
47.0 134	-50.8	-45.6	-32.9	-20.1	-9.1	+24.5	+64.4	+75.4	+79.4	+80.4	+83.5	+86.6					
48.0 136	-52.4	-37.6	-30.0	-18.2	-6.2	+23.5	+69.5	+77.4	+80.4	+83.5	+86.6	+86.7					
49.0 130	-47.8	-40.7	-34.0	-17.4	-5.4	+19.1	+69.7	+81.2	+83.0	+85.0	+89.1	+84.4					
50.0 127	-40.3	-39.7	-33.1	-16.6	-4.9	+19.1	+71.4	+81.2	+85.1	+85.0	+97.4	+94.0					
51.0 122	-34.8	-32.4	-29.2	-19.9	-5.6	+20.0	+71.4	+83.0	+86.4	+84.4	+103.4	+104.0					
52.0 115	-31.1	-30.7	-25.2	-14.1	-4.1	+14.4	+69.9	+84.4	+94.4	+104.0	+109.7	+109.4					
53.0 110	-40.3	-33.0	-31.2	-25.2	-2.9	+14.0	+70.1	+84.4	+94.4	+104.0	+120.6	+120.7					
54.0 102	-37.2	-37.0	-31.0	-21.4	-4.4	+19.5	+70.4	+85.0	+96.7	+100.0	+100.4	+100.9					
55.0 92	-34.5	-37.4	-31.0	-24.4	-3.5	+21.0	+74.4	+87.4	+95.0	+110.1	+111.1	+111.2					
56.0 81	-41.2	-34.2	-34.2	-16.0	-4.1	+24.4	+77.0	+93.0	+109.2	+114.4	+119.3	+119.5					
57.0 67	-39.8	-34.4	-34.4	-14.4	-4.1	+27.5	+79.4	+91.7	+103.4	+106.4	+106.4	+107.0					
58.0 51	-40.2	-34.4	-34.4	-15.4	-6.0	+21.5	+61.0	+86.5	+93.4	+95.7	+97.2	+97.3					
59.0 39	-32.0	-34.4	-34.4	-21.1	-8.4	+27.4	+69.4	+85.1	+111.1	+111.1	+111.1	+111.9					
60.0 22	-19.6	-34.4	-34.4	-14.4	-1.5	+36.0	+59.5	+87.0	+125.4	+125.7	+125.9	+125.9					
61.0 15	-12.8	-34.4	-34.4	-14.4	-1.5	+34.4	+87.6	+101.1	+101.7	+101.0	+102.0	+102.0					
62.0 4	-6.7	-34.4	-34.4	-14.4	-1.5	+31.1	+45.0	+78.7	+100.5	+100.7	+100.4	+100.9					
63.0 2	-6.3	-34.4	-34.4	-14.4	-1.5	+31.1	+45.0	+78.7	+100.5	+100.7	+100.4	+100.9					
64.0 1	-6.1	-34.4	-34.4	-14.4	-1.5	+31.1	+45.0	+78.7	+100.5	+100.7	+100.4	+100.9					

Positive is wind from the tail (285°).
Negative is wind from the head (105°).

DATA SOURCE											ANNUAL					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC 8766	-12.0	-9.6	-7.3	-4.2	-4.9	-3.5	-0.7	1.5	3.7	5.2	6.7	9.0	11.0	11.0	11.0	
10 8766	-30.0	-17.5	-11.6	-9.9	-8.3	-5.3	-0.5	5.3	10.1	13.3	16.4	21.6	27.0	27.0	27.0	
20 8766	-30.0	-16.3	-10.5	-8.5	-6.5	-3.4	1.0	8.0	14.0	17.5	20.8	27.5	33.0	33.0	33.0	
30 8766	-29.0	-15.7	-9.2	-7.3	-5.3	-2.1	2.5	11.0	17.7	21.7	25.2	33.5	41.0	41.0	41.0	
40 8766	-24.0	-13.7	-8.5	-6.7	-4.9	-1.4	3.8	14.0	21.7	25.3	29.8	40.0	51.0	51.0	51.0	
50 8766	-25.0	-13.3	-7.9	-6.5	-4.6	-1.0	5.4	17.4	25.7	29.9	34.9	47.0	65.0	65.0	65.0	
60 8766	-24.0	-13.0	-8.3	-6.6	-4.7	-0.8	6.9	20.9	29.5	34.6	43.0	57.2	79.0	79.0	79.0	
70 8766	-24.0	-14.5	-9.2	-6.8	-4.8	-0.7	8.7	24.4	33.6	39.3	49.8	63.1	87.0	87.0	87.0	
80 8766	-26.0	-14.9	-9.7	-7.4	-5.0	-0.7	10.6	28.0	38.2	44.4	56.8	72.0	89.0	89.0	89.0	
90 8766	-22.0	-15.9	-10.5	-8.4	-5.5	-0.6	12.4	31.9	43.1	49.7	62.2	76.3	109.0	109.0	109.0	
100 8766	-26.0	-14.4	-12.3	-9.4	-6.3	-0.4	14.3	36.0	48.2	54.7	68.2	82.2	109.0	109.0	109.0	
110 8766	-28.0	-21.1	-14.2	-10.5	-6.9	-0.3	16.9	39.5	52.1	59.5	72.7	86.7	109.0	109.0	109.0	
120 8766	-31.0	-23.5	-15.9	-11.8	-7.6	-0.1	19.5	41.8	54.5	61.3	74.3	88.0	109.0	109.0	109.0	
130 8766	-38.0	-24.2	-16.9	-12.6	-7.8	0.3	21.1	42.0	53.9	60.3	72.7	86.0	109.0	109.0	109.0	
140 8766	-29.0	-21.8	-15.4	-11.7	-7.8	-0.0	20.3	39.1	49.7	56.0	68.9	82.0	109.0	109.0	109.0	
150 8766	-26.0	-20.0	-13.3	-10.4	-7.3	-0.7	17.5	34.0	43.1	48.9	59.8	73.0	109.0	109.0	109.0	
160 8766	-20.0	-16.0	-11.5	-9.4	-7.3	-2.2	13.1	28.7	36.9	41.7	49.7	55.5	65.0	65.0	65.0	
170 8766	-17.0	-14.3	-11.5	-9.9	-8.1	-4.2	8.6	23.2	30.6	34.7	39.0	47.6	58.0	58.0	58.0	
180 8766	-18.0	-15.7	-12.4	-11.3	-9.8	-6.3	4.3	16.8	23.8	27.6	31.2	38.5	48.0	48.0	48.0	
190 8766	-21.0	-17.1	-14.6	-13.2	-11.8	-8.5	0.5	10.9	17.7	21.9	25.7	32.7	40.0	40.0	40.0	
200 8766	-28.0	-21.3	-17.9	-16.3	-14.5	-10.5	0.9	6.9	13.0	17.0	20.7	28.0	33.0	33.0	33.0	
210 8766	-34.0	-23.6	-19.9	-18.4	-16.3	-12.1	2.5	5.2	10.6	14.0	17.5	24.7	33.0	33.0	33.0	
220 8766	-38.0	-25.4	-21.1	-19.6	-17.7	-13.5	3.5	4.3	9.9	13.2	16.5	25.8	33.0	33.0	33.0	
230 8766	-41.0	-26.2	-22.1	-20.6	-18.9	-14.6	4.3	4.2	9.9	13.7	17.2	26.0	36.0	36.0	36.0	
240 8766	-40.0	-27.0	-23.6	-21.7	-19.9	-15.6	4.6	5.1	11.2	15.2	18.9	27.7	37.0	37.0	37.0	
250 8766	-38.0	-29.0	-25.0	-22.9	-20.7	-16.3	4.4	6.4	13.4	17.9	21.9	29.7	39.0	39.0	39.0	
260 8766	-35.0	-30.8	-26.2	-23.9	-21.6	-16.8	4.1	7.7	16.0	19.9	23.0	33.7	47.0	47.0	47.0	
270 8766	-48.0	-32.3	-27.3	-25.0	-22.5	-17.3	4.0	9.3	18.2	21.8	25.8	33.3	49.0	49.0	49.0	
280 1199	-30.2	-20.8	-27.9	-25.2	-23.0	-18.8	4.8	11.4	19.7	23.7	26.2	32.4	39.4	39.4	39.4	
290 1224	-34.4	-31.1	-28.2	-25.7	-23.5	-19.2	4.1	13.7	23.4	26.2	29.4	34.3	44.4	44.4	44.4	
300 1244	-39.5	-38.1	-29.8	-27.1	-25.2	-20.4	4.4	16.4	25.0	29.0	33.4	41.3	46.4	46.4	46.4	
310 1262	-36.3	-35.1	-31.1	-28.7	-26.2	-20.4	4.0	19.1	27.4	32.4	37.1	43.4	46.4	46.4	46.4	
320 1274	-40.6	-40.1	-31.0	-28.1	-26.4	-20.4	4.7	21.7	31.1	35.1	39.1	45.1	49.7	49.7	49.7	
330 1299	-44.4	-40.2	-34.0	-30.2	-27.1	-20.7	0.8	24.4	33.0	37.7	42.4	51.2	54.0	54.0	54.0	
340 1316	-54.7	-50.2	-34.4	-31.9	-27.4	-21.5	0.1	25.1	36.4	40.7	44.0	54.2	60.1	60.1	60.1	
350 1330	-67.9	-62.2	-38.1	-33.0	-30.2	-21.9	0.1	26.5	37.9	43.4	48.1	59.2	62.4	62.4	62.4	
360 1333	-67.6	-61.2	-37.9	-33.4	-30.4	-23.2	0.2	26.4	39.0	45.6	51.0	60.6	64.9	64.9	64.9	
370 1339	-71.2	-64.9	-34.4	-35.2	-31.4	-25.1	0.4	27.6	40.7	47.0	54.0	66.2	71.0	71.0	71.0	
380 1344	-61.6	-67.2	-41.1	-37.0	-33.4	-25.4	0.0	29.4	42.7	49.4	58.4	70.2	80.6	80.6	80.6	
390 1355	-76.8	-72.2	-49.1	-38.4	-34.7	-26.7	-0.5	30.4	44.0	49.4	59.4	75.2	79.7	79.7	79.7	
400 1357	-84.0	-67.2	-42.5	-39.4	-36.1	-27.6	-1.0	32.1	45.2	52.0	59.4	74.2	80.1	80.1	80.1	
410 1357	-89.3	-66.2	-45.0	-42.2	-37.4	-29.0	-0.7	34.1	47.4	54.0	60.4	78.2	80.1	80.1	80.1	
420 1349	-85.7	-65.2	-47.4	-44.1	-39.0	-30.9	-1.4	31.7	50.1	56.0	62.1	77.2	78.5	78.5	78.5	
430 1334	-94.3	-65.2	-49.4	-46.1	-41.9	-33.1	-2.1	35.4	53.2	57.4	61.9	76.2	81.9	81.9	81.9	
440 1322	-94.4	-58.2	-51.0	-48.6	-45.2	-35.1	-1.5	35.6	53.6	61.0	63.0	75.2	88.0	88.0	88.0	
450 1305	-84.3	-65.2	-54.6	-51.4	-47.1	-37.7	-1.1	35.5	57.2	64.6	68.7	83.2	90.4	90.4	90.4	
460 1287	-90.2	-64.1	-57.2	-54.0	-48.7	-37.1	-0.6	37.5	60.1	68.4	73.0	79.3	91.0	91.0	91.0	
470 1261	-84.1	-64.1	-59.7	-56.1	-50.2	-39.0	-0.1	34.0	63.4	71.7	75.4	81.1	89.4	89.4	89.4	
480 1234	-79.1	-61.1	-59.2	-56.4	-50.6	-40.2	1.1	40.1	66.6	76.0	78.0	87.3	90.3	90.3	90.3	
490 1214	-66.1	-64.4	-59.4	-56.4	-52.5	-39.8	1.0	42.0	68.1	78.2	82.2	89.2	90.3	90.3	90.3	
500 1174	-64.2	-64.4	-60.4	-57.0	-52.7	-39.1	2.0	44.4	70.0	77.4	83.4	97.7	99.9	99.9	99.9	
510 1131	-75.6	-67.7	-62.4	-59.2	-53.0	-39.4	1.0	44.5	70.4	79.1	85.7	103.5	106.4	106.4	106.4	
520 1071	-70.9	-70.4	-64.0	-60.1	-54.3	-39.4	1.6	45.7	70.4	78.0	87.6	106.6	107.9	107.9	107.9	
530 1011	-87.3	-70.6	-65.4	-60.0	-54.3	-40.1	3.3	44.2	70.4	80.4	90.1	104.6	109.4	109.4	109.4	
540 924	-74.1	-73.7	-63.0	-60.2	-53.7	-40.9	4.4	50.4	70.9	81.2	90.4	104.7	120.7	120.7	120.7	
550 840	-84.7	-75.0	-64.1	-60.1	-54.5	-40.4	6.2	50.1	72.0	81.1	92.4	94.9	111.2	111.2	111.2	
560 743	-72.4	-61.1	-60.1	-56.4	-56.2	-40.1	5.2	53.2	73.1	85.0	92.4	110.0	119.5	119.5	119.5	
570 640	-70.1	-65.1	-61.2	-56.0	-51.6	-41.6	6.0	54.4	74.1	88.0	98.4	110.1	110.6	110.6	110.6	
580 515	-71.8	-65.1	-61.2	-56.0	-51.6	-41.6	6.0	54.4	74.1	88.0	98.4	110.1	110.6	110.6	110.6	
590 393	-71.2	-70.0	-64.1	-58.7	-50.5	-40.5	8.5	53.0	76.7	85.0	97.1	111.4	111.9	111.9	111.9	
600 273	-75.7	-74.1	-66.0	-59.1	-54.3	-43.4	6.5	54.2	81.4	93.0	104.1	125.4	125.9	125.9	125.9	
610 194	-81.6	-74.7	-75.7	-68.1	-64.3	-47.8	2.0	54.2	81.4	90.7	101.1	104.6	104.4	104.4	104.4	
620 124	-87.5	-76.8	-75.4	-65.4	-51.1	-41.0	1.0	56.1	84.4	92.0	100.4	112.0	112.2	112.2	112.2	
630 76	-82.7	-77.1	-77.2	-65.0	-50.2	-40.0	6.0	60.0	90.2	93.1	97.1	98.0	98.1	98.1	98.1	
640 44	-81.8	-65.5	-67.1	-65.5	-54.2	-40.1	6.1	64.2	83.5	85.0	134.1	134.5	134.5	134.5	134.5	
650 34	-69.9	-67.1	-50.0	-45.0	-40.0	-35.0	1.0	44.0	70.1	70.4	70.4	71.0	71.1	71.1	71.1	
660 29	-80.1	-58.5	-43.4	-35.1	-31.7	-24.1	1.5	51.7	64.6	67.4	67.4	64.1	64.2	64.2	64.	

DATA SOURCE										JANUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION (msl)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE 5.000	PERCENTAGE 15.900	FREQUENCY 50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-10.0	-9.9	-8.5	-7.1	-5.6	-3.5	-0.9	+1.4	+3.6	+6.5	+5.8	+7.9	+10.0		
1.0	744	-17.0	-14.9	-11.8	-10.0	-8.5	-6.5	-0.3	+7.0	+11.5	+14.1	+18.1	+22.9	+27.0		
2.0	744	-25.0	-23.9	-11.8	-9.5	-6.8	-3.0	+1.7	+8.5	+14.1	+17.0	+18.9	+23.4	+24.0		
3.0	744	-27.0	-12.7	-9.0	-6.7	-2.7	+2.9	+10.3	+15.8	+20.7	+23.2	+33.9	+35.0			
4.0	744	-29.0	-25.9	-13.8	-10.5	-6.1	-1.9	+3.9	+12.4	+18.8	+23.2	+25.5	+37.9	+41.0		
5.0	744	-31.0	-25.9	-16.2	-12.0	-6.9	-1.2	+5.3	+14.1	+21.8	+27.6	+30.1	+38.9	+40.0		
6.0	744	-33.0	-26.9	-17.5	-13.0	-6.9	-0.9	+7.3	+16.5	+24.6	+30.6	+34.8	+44.9	+48.0		
7.0	744	-26.0	-25.9	-17.5	-13.0	-8.1	-0.7	+8.5	+19.3	+28.6	+35.5	+40.5	+45.9	+49.0		
8.0	744	-25.0	-24.9	-19.5	-14.7	-8.1	-0.4	+9.8	+21.7	+31.6	+40.0	+46.5	+53.9	+57.0		
9.0	744	-30.0	-20.5	-14.3	-8.8	-0.1	+12.3	+23.5	+33.9	+43.0	+49.2	+57.9	+61.0			
10.0	744	-34.0	-22.5	-15.2	-9.5	-0.1	+12.3	+26.3	+38.3	+45.6	+52.7	+57.9	+61.0			
11.0	744	-31.0	-22.2	-15.7	-9.9	-0.4	+13.0	+29.3	+40.2	+46.6	+53.7	+57.9	+61.0			
12.0	744	-38.0	-35.9	-22.2	-15.0	-9.5	+0.2	+14.3	+29.4	+40.9	+46.6	+54.5	+57.9	+61.0		
13.0	744	-28.0	-24.9	-16.2	-10.7	-6.8	+1.8	+13.8	+27.4	+36.7	+43.2	+45.7	+57.9	+59.0		
14.0	744	-19.0	-16.9	-12.8	-10.5	-3.9	+1.8	+12.3	+24.8	+33.4	+39.0	+42.1	+49.9	+52.0		
15.0	744	-17.0	-16.9	-10.7	-8.2	-4.9	+1.6	+11.6	+22.6	+29.9	+32.8	+38.2	+44.9	+46.0		
16.0	744	-19.0	-16.9	-9.9	-8.2	-3.7	+1.4	+10.4	+19.4	+24.8	+27.8	+30.2	+35.9	+39.0		
17.0	744	-15.0	-14.9	-10.7	-7.7	-4.3	+0.1	+9.0	+15.8	+20.7	+24.0	+25.6	+32.9	+34.0		
18.0	744	-17.0	-11.9	-9.6	-7.2	-4.3	+0.3	+8.5	+12.0	+17.1	+19.2	+20.3	+23.6	+24.0		
19.0	744	-13.0	-9.9	-6.8	-5.4	-3.9	+0.6	+3.3	+8.3	+12.8	+15.8	+17.8	+23.9	+25.0		
20.0	744	-14.0	-11.9	-7.5	-5.7	-4.2	-1.6	+1.7	+6.1	+9.6	+12.4	+14.3	+16.9	+19.0		
21.0	744	-18.0	-8.7	-7.1	-5.0	-2.0	+1.0	+4.8	+7.8	+9.6	+11.8	+14.9	+18.0			
22.0	744	-15.0	-11.9	-8.8	-6.8	-5.2	-2.4	+0.6	+4.7	+8.9	+10.8	+13.7	+17.9	+20.0		
23.0	744	-19.0	-13.9	-10.2	-7.0	-5.3	-2.3	+0.6	+5.0	+8.6	+11.5	+16.5	+24.9	+26.0		
24.0	744	-18.0	-13.9	-11.4	-7.3	-5.3	-2.4	+0.9	+5.6	+9.0	+11.2	+13.8	+17.9	+24.0		
25.0	744	-13.0	-10.5	-8.1	-5.9	-5.9	-2.2	+1.6	+6.1	+10.0	+12.7	+16.1	+21.9	+25.0		
26.0	744	-14.0	-11.8	-8.7	-6.4	-4.4	-2.2	+2.0	+7.7	+12.6	+15.2	+17.6	+22.9	+28.0		
27.0	744	-17.0	-14.9	-10.7	-8.7	-6.5	-1.7	+2.3	+9.1	+14.6	+18.6	+22.5	+26.9	+35.0		
28.0	104	-4.3	-6.0	-2.6	-1.6	-0.5	-0.4	0.5	6.4	10.4	15.0	19.4	24.0	25.0		
29.0	107	-7.9	-7.0	-6.3	-3.9	0.7	6.5	12.3	16.6	18.4	19.0	20.7	20.4			
30.0	104	-8.7	-8.7	-8.3	-3.6	1.0	8.2	14.2	17.0	20.6	21.0	22.5	22.6			
31.0	109	-8.9	-7.0	-6.5	-0.4	1.0	9.0	15.6	20.6	23.4	24.0	25.4	25.5			
32.0	113	-14.0	-11.0	-10.4	-2.7	2.7	8.6	17.2	21.2	23.0	24.0	26.0	30.7	30.9		
33.0	115	-18.7	-15.0	-15.4	-5.6	1.9	8.1	16.3	22.6	27.0	28.0	30.0	31.7	31.8		
34.0	117	-20.5	-20.4	-18.4	-10.1	-0.2	7.2	16.4	23.0	28.0	28.5	29.1	29.2			
35.0	116	-24.0	-19.8	-18.4	-10.1	-0.2	6.8	15.0	24.0	27.0	28.5	29.1	29.2			
36.0	116	-19.8	-13.0	-13.2	-10.6	-1.6	7.3	16.3	25.4	27.0	27.0	30.0	30.2			
37.0	114	-20.1	-17.0	-13.7	-12.1	-2.0	7.7	16.5	25.4	26.7	31.0	32.7	32.4			
38.0	115	-15.6	-14.8	-13.4	-11.1	-1.0	8.1	17.0	25.1	28.0	34.0	35.6	35.7			
39.0	117	-17.2	-14.8	-12.3	-7.1	-2.1	8.4	19.4	27.0	32.0	35.8	37.5	37.6			
40.0	115	-20.7	-15.8	-14.4	-5.3	-1.7	8.1	19.4	26.3	33.0	36.0	38.0	39.2			
41.0	117	-32.7	-16.8	-15.3	-11.1	0.6	9.2	20.3	26.0	35.8	36.0	38.0	39.1			
42.0	114	-37.3	-19.0	-13.4	-7.3	0.3	10.0	20.6	32.3	36.0	36.0	43.0	44.1			
43.0	113	-25.9	-21.0	-15.7	-4.2	-0.5	10.4	22.8	35.0	38.7	40.0	43.0	44.0			
44.0	113	-22.5	-20.0	-10.4	-6.4	0.5	12.8	22.7	37.0	39.0	47.0	49.1	49.4			
45.0	111	-24.9	-23.0	-18.7	-9.4	0.2	13.5	26.4	35.5	40.7	50.0	53.1	53.3			
46.0	110	-28.2	-24.0	-21.5	-10.5	0.8	15.0	28.8	36.5	42.6	51.0	54.8	58.9			
47.0	106	-29.4	-25.0	-17.6	-9.7	1.0	15.0	31.2	41.7	45.6	60.0	65.2	65.4			
48.0	104	-30.5	-23.0	-15.0	-8.0	-4.5	17.3	30.0	45.4	49.4	61.0	71.7	71.9			
49.0	100	-36.5	-37.0	-15.7	-11.0	1.0	19.3	33.0	46.0	51.7	53.0	72.2	72.4			
50.0	100	-44.3	-44.0	-15.0	-14.0	-0.1	19.7	32.8	47.5	52.7	58.0	67.1	67.3			
51.0	95	-40.0	-16.8	-13.2	1.5	10.1	33.2	41.4	51.0	58.1	59.0	59.0	59.1			
52.0	88	-51.9	-21.0	-13.6	-1.2	17.8	32.5	43.3	48.6	53.0	53.0	53.1	53.3			
53.0	83	-50.9	-29.1	-11.4	-11.4	1.2	18.0	31.0	41.0	50.1	53.1	53.1	53.4	53.7		
54.0	72	-31.5	-17.0	-11.4	-3.1	-20.7	35.4	51.4	52.7	53.2	53.8	53.8	53.9			
55.0	64	-28.1	-18.5	-8.9	2.1	19.0	33.8	42.4	50.8	50.8	59.1	59.7	59.7			
56.0	57	-28.9	-18.7	-13.1	-4.0	-21.6	37.0	49.0	49.0	63.4	63.6	63.7				
57.0	46	-28.4	-11.7	-2.4	2.4	25.0	39.0	47.7	54.0	67.8	67.6	67.7				
58.0	26	-28.6	-15.7	-1.0	-22.3	43.9	61.7	71.4	71.4	71.5	71.7	71.7				
59.0	14	-27.4	-11.0	-17.0	-5.1	25.0	67.1	50.1	50.7	50.8	51.1	51.1				
60.0	10	-27.7	-11.0	-17.0	-5.1	25.0	67.1	50.1	50.7	50.8	51.1	51.1				
61.0	7	-24.3	-4.1	12.5	20.9	44.7	44.0	45.0	44.0	45.0	45.0	45.1	45.1			
62.0	6	8.8	-15.0	45.1	45.8	45.8	45.0	45.1	45.8	45.0	46.0	46.1	46.1			
63.0	5	4.3	-19.5	46.2	46.7	46.0	46.0	46.2	46.7	46.0	46.0	46.0	47.0			
64.0	4	-2.5	-14.0	47.1	47.6	47.0	47.0	47.1	47.6	47.0	47.0	47.0	47.8			
65.0	3	4.5	-17.5	39.7	40.1	40.0	40.0	40.1	40.0	40.0	40.0	40.0	40.3			
66.0	3	-7.0	-14.5	34.7	34.1	34.0	34.0	34.7	34.1	34.0	34.0	34.0	34.3			
67.0	3	-4.0	-5.4	29.5	29.0	29.0	29.0	29.0	29.0	29.0	30.0	30.0	30.0			
68.0	4	-2.9	-9.0	42.2	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.5			
69.0	4	0.5	-10.0	35.1	35.4	35.0	35.0	35.1	35.4	35.0	35.0	35.0	36.0			
70.0	4	7.6	-15.0	40.3	40.7	40.8	40.8	40.3	40.7	40.8	40.8	40.8	40.9			

Positive is wind from the right (195°).
Negative is wind from the left (015°).

RIGHT AND LEFT CROSS WIND COMPONENTS 105 DEGREE FLIGHT AZIMUTH TABLE 13.2

DATA SOURCE										FEBRUARY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	678	-12.0			-8.6	-7.2	-5.5	-3.1	-0.5	+2.3	+4.5	+6.0	+7.3	+11.5	+12.0	
1.0	678	-15.0			-10.4	-9.0	-6.7	-2.7	+1.6	+8.1	+13.1	+17.7	+20.3	+26.0	+27.0	
2.0	678	-13.0			-11.0	-9.5	-6.7	-1.6	+2.5	+9.0	+14.3	+19.2	+22.5	+25.5	+26.0	
3.0	678	-17.0			-13.4	-8.9	-6.6	-1.0	+3.5	+11.3	+17.3	+19.9	+23.4	+29.6	+30.0	
4.0	678	-17.0			-14.1	-9.3	-6.0	-0.6	+5.0	+13.3	+20.0	+22.2	+26.4	+37.0	+38.0	
5.0	678	-19.0			-14.1	-9.8	-5.8	-0.6	+6.4	+16.2	+22.2	+28.1	+30.5	+37.0	+38.0	
6.0	678	-22.0			-15.1	-9.8	-5.6	-0.1	+8.5	+18.1	+26.0	+30.8	+33.7	+39.5	+40.0	
7.0	678	-25.0			-14.2	-10.7	-5.6	-0.1	+9.3	+21.3	+29.2	+35.5	+38.6	+48.0	+49.0	
8.0	678	-26.0			-17.1	-10.8	-7.4	-0.0	+10.2	+23.5	+32.7	+36.5	+41.1	+54.0	+55.0	
9.0	678	-29.0			-18.1	-12.8	-8.1	-0.0	+11.3	+26.5	+35.8	+40.5	+46.7	+53.0	+54.0	
10.0	678	-39.0			-21.6	-16.3	-9.5	+0.2	+12.0	+28.6	+37.8	+42.5	+51.2	+62.0	+63.0	
11.0	678	-57.0			-25.1	-16.5	-9.8	+0.2	+13.2	+30.7	+41.4	+46.8	+53.1	+74.5	+75.0	
12.0	678	-49.0			-21.2	-15.7	-10.8	+0.3	+14.2	+31.5	+40.8	+45.7	+54.0	+69.0	+70.0	
13.0	678	-35.0			-16.4	-13.4	-7.6	+1.7	+13.7	+29.2	+37.8	+43.8	+48.1	+64.0	+65.0	
14.0	678	-33.0			-16.2	-10.8	-6.0	+1.7	+13.3	+26.0	+34.5	+39.5	+43.6	+50.5	+51.0	
15.0	678	-40.0			-11.2	-7.3	-3.8	+1.5	+11.7	+21.9	+27.5	+32.1	+34.2	+45.0	+46.0	
16.0	678	-30.0			-12.2	-7.2	-3.5	+1.4	+9.7	+19.1	+24.7	+27.5	+30.6	+33.5	+34.0	
17.0	678	-26.0			-12.2	-5.9	-3.3	+0.4	+7.3	+14.7	+20.0	+24.4	+26.3	+30.0	+31.0	
18.0	678	-20.0			-13.1	-7.1	-3.8	-0.5	+5.0	+11.5	+16.1	+19.1	+20.8	+24.5	+25.0	
19.0	678	-18.0			-11.2	-5.9	-3.6	-0.9	+2.8	+8.2	+13.1	+14.9	+17.6	+26.0	+27.0	
20.0	678	-12.0			-7.5	-6.3	-4.4	-2.1	+1.2	+6.1	+10.3	+12.8	+15.7	+23.0	+24.0	
21.0	678	-20.0			-13.1	-9.6	-6.6	-3.3	+0.1	+4.2	+8.3	+10.7	+14.7	+22.0	+23.0	
22.0	678	-31.0			-11.6	-8.5	-6.4	-3.5	-0.4	+3.3	+6.3	+7.9	+10.5	+20.0	+21.0	
23.0	678	-21.0			-11.2	-8.3	-6.4	-3.7	-0.4	+3.1	+6.4	+9.1	+12.2	+18.0	+19.0	
24.0	678	-11.0			-8.9	-6.0	-6.7	-3.7	-0.2	+3.4	+6.6	+8.5	+10.7	+21.0	+22.0	
25.0	678	-16.0			-11.5	-9.8	-6.9	-3.6	-0.3	+3.2	+6.3	+7.7	+8.8	+13.0	+14.0	
26.0	678	-15.0			-12.1	-8.3	-6.8	-3.7	-0.2	+3.6	+6.7	+8.6	+11.0	+14.0	+15.0	
27.0	678	-23.0			-9.6	-8.1	-6.4	-3.4	-0.1	+4.0	+7.2	+9.4	+11.6	+15.0	+16.0	
28.0	82	-6.0			-5.1	-3.0	-1.6	-2.2	0.2	6.5	9.6	10.4	13.2	14.0	14.1	
29.0	82	-4.1			-7.1	-6.0	-1.6	-1.4	2.4	7.4	11.2	11.0	12.1	12.7	12.8	
30.0	81	-9.6			-8.4	-6.5	-0.6	0.1	11.0	14.0	14.0	14.7	17.2	17.4	17.4	
31.0	81	-4.7			-8.2	-6.0	0.0	0.0	12.5	16.0	16.0	17.2	19.1	19.7	19.7	
32.0	81	-10.3			-7.4	-6.0	1.0	0.4	14.4	19.5	25.0	25.0	27.0	27.1	27.1	
33.0	84	-9.5			-7.0	-5.6	-1.0	7.0	10.0	17.3	19.0	22.1	22.7	22.7	22.4	
34.0	94	-10.7			-8.4	-6.2	-2.7	5.2	11.4	15.4	17.0	22.1	23.1	23.1	23.2	
35.0	100	-14.3			-14.4	-11.0	-2.0	3.7	10.0	14.0	14.0	20.0	22.0	22.4	22.5	
36.0	102	-17.2			-8.0	-8.0	-1.0	6.0	11.0	14.0	14.0	20.7	21.7	22.4	22.5	
37.0	105	-15.8			-12.4	-9.7	-2.4	4.4	12.5	16.5	17.4	20.4	21.0	20.5	20.5	
38.0	107	-14.2			-14.0	-12.4	-0.6	-3.4	4.0	14.0	19.2	20.4	21.0	22.5	22.6	
39.0	109	-19.6			-17.0	-13.5	-10.6	-1.7	5.7	14.3	20.3	21.0	26.4	26.7	26.4	
40.0	109	-17.4			-15.0	-14.5	-10.4	-2.4	6.6	14.5	21.2	23.4	26.4	40.3	40.5	
41.0	112	-15.2			-14.4	-10.4	-2.1	7.4	16.5	24.2	34.4	44.0	47.4	47.9	48.1	
42.0	109	-19.5			-13.0	-12.5	-9.6	-0.9	9.6	14.2	26.4	36.4	37.0	48.2	48.5	
43.0	104	-20.5			-13.0	-12.3	-10.3	-1.5	12.2	21.0	28.4	37.4	40.0	51.7	51.4	
44.0	106	-23.4			-15.0	-14.3	-9.4	0.0	13.0	23.5	32.0	50.4	51.0	54.0	55.2	
45.0	106	-19.0			-12.0	-11.4	-5.9	2.6	14.5	25.4	34.2	44.4	62.0	64.0	65.0	
46.0	102	-13.7			-13.0	-7.7	-2.9	4.1	16.0	29.4	34.0	46.7	64.0	72.7	72.4	
47.0	102	-14.7			-10.0	-6.7	-0.9	5.1	16.0	29.4	37.0	48.7	64.0	70.4	70.9	
48.0	94	-20.1			-5.4	-1.1	5.4	14.3	24.5	34.1	44.4	48.4	59.5	60.0	60.0	
49.0	94	-25.9			-3.4	-0.2	5.7	16.2	24.0	37.4	42.4	51.1	52.2	52.4	52.4	
50.0	90	-56.3			0.0	1.3	6.1	16.4	27.0	35.5	37.0	51.1	51.5	51.6	51.6	
51.0	83	-43.6			-3.1	1.1	5.7	16.9	27.9	35.4	50.1	52.2	53.2	53.4	53.4	
52.0	80	-48.5			-7.2	-3.0	7.2	-16.7	30.7	42.0	52.4	53.1	53.5	53.5	53.5	
53.0	74	-51.9			-9.3	2.7	4.1	17.0	32.3	42.3	50.3	52.2	52.6	52.7	52.7	
54.0	64	-56.7			-10.5	1.7	6.4	20.3	33.5	43.7	51.4	53.3	53.9	53.9	53.9	
55.0	60	-51.8			0.4	2.0	5.3	24.0	40.5	44.0	51.4	53.4	53.4	53.4	53.4	
56.0	50	-46.8			-2.9	-1.5	6.5	22.0	36.7	54.5	57.0	58.7	59.3	59.4	59.4	
57.0	45	-56.0			-5.0	-3.9	6.4	22.4	34.4	53.4	54.0	74.7	75.3	75.4	75.4	
58.0	34	-44.1			-7.0	-11.2	22.4	33.0	45.1	54.1	54.4	54.4	54.7	54.7	54.7	
59.0	27	-11.2			2.4	6.3	27.5	35.0	41.7	49.4	42.4	42.4	42.7	42.7	42.7	
60.0	20	-14.3			-14.0	-17.2	30.0	34.0	43.0	49.4	49.4	49.4	49.4	49.3	49.3	
61.0	13	-17.9			17.1	34.3	40.0	51.3	51.7	51.4	51.4	51.4	51.4	51.4	51.4	
62.0	7	-23.0			15.1	34.5	36.0	49.4	50.0	50.2	50.2	50.2	50.2	50.2	50.2	
63.0	4	21.1			21.0	60.3	60.7	60.0	60.4	60.4	60.4	60.4	60.4	60.4	60.4	
64.0	2	-20.3			20.0	34.7	34.0	34.7	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
65.0	1	25.4			24.0	24.0	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	
66.0	2	-23.1			24.0	24.0	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	
67.0	1	47.4			47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
68.0	3	-14.1			47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
69.0	3	17.5			47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
70.0	3	1.6			47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE							MARCH													
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)													
				LATITUDE	LONGITUDE															
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956														
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967														
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967														
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																				
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	CUMULATIVE PERCENTAGE FREQUENCY															MAX SPEED	DIR (DEG)
				0.135	1,000	2,280	5,000	15,900	50,000	84,100	95,000	97,720	99,000	99,865						
5FC	744	-13.0	-11.9	-8.5	-7.5	-5.9	-3.2	-0.4	+2.1	+4.1	+5.6	+6.9	+9.9	+12.0						
1.0	744	-20.0	-13.9	-11.8	-9.8	-7.0	-3.7	+1.3	+7.2	+11.6	+15.0	+17.5	+19.9	+24.0						
2.0	744	-17.0	-15.9	-11.2	-8.0	-6.0	-2.6	+1.8	+8.2	+12.9	+15.6	+17.8	+23.9	+25.0						
3.0	744	-24.0	-16.9	-10.7	-7.5	-5.7	-2.3	+2.4	+9.5	+15.8	+19.1	+20.8	+25.9	+31.0						
4.0	744	-23.0	-14.9	-10.6	-8.0	-6.1	-2.2	+2.7	+10.7	+17.2	+21.4	+25.7	+32.9	+38.0						
5.0	744	-20.0	-18.9	-11.5	-8.8	-6.3	-1.6	+3.8	+11.9	+18.6	+22.6	+31.5	+37.4	+38.0						
6.0	744	-20.0	-17.9	-12.5	-9.2	-6.5	-1.1	+4.9	+14.4	+21.3	+27.0	+32.5	+46.9	+52.0						
7.0	744	-19.0	-18.9	-14.5	-10.6	-6.6	-0.9	+6.2	+16.1	+24.8	+30.5	+34.7	+57.4	+58.0						
8.0	744	-21.0	-19.9	-16.1	-12.0	-6.5	-0.8	+7.0	+18.1	+27.6	+32.5	+37.5	+49.9	+58.0						
9.0	744	-24.0	-23.9	-18.5	-12.0	-8.5	-1.5	+7.7	+20.4	+31.1	+36.6	+44.7	+63.9	+72.0						
10.0	744	-29.0	-28.9	-21.5	-15.0	-10.0	-2.0	+9.0	+23.4	+33.9	+41.5	+50.8	+62.9	+70.0						
11.0	744	-36.0	-33.9	-24.7	-17.7	-12.5	-3.2	+9.8	+24.1	+35.2	+47.0	+60.5	+82.9	+84.0						
12.0	744	-39.0	-35.9	-21.8	-16.0	-9.9	-1.7	+10.2	+24.8	+37.5	+46.0	+53.7	+75.9	+78.0						
13.0	744	-27.0	-25.9	-20.2	-13.0	-7.2	-0.2	+10.5	+24.2	+33.5	+38.5	+50.5	+66.9	+74.0						
14.0	744	-26.0	-23.9	-11.8	-8.6	-4.5	-0.3	+9.8	+20.6	+29.3	+34.6	+37.2	+50.9	+55.0						
15.0	744	-22.0	-19.9	-11.2	-7.6	-3.7	+1.0	+9.2	+18.8	+24.7	+29.8	+34.7	+43.9	+49.0						
16.0	744	-16.0	-15.9	-10.7	-6.6	-3.3	+0.9	+7.7	+15.4	+20.9	+25.5	+29.7	+35.9	+48.0						
17.0	744	-16.0	-14.9	-7.8	-5.4	-3.4	-0.1	+6.0	+12.9	+19.5	+23.8	+25.8	+30.9	+32.0						
18.0	744	-13.0	-12.9	-7.2	-5.1	-3.6	-0.6	+3.9	+9.8	+15.3	+18.6	+21.5	+27.9	+29.0						
19.0	744	-14.0	-12.9	-7.9	-5.6	-3.8	-1.2	+1.8	+6.7	+10.9	+14.5	+19.2	+24.9	+26.0						
20.0	744	-11.0	-7.7	-6.2	-4.6	-2.1	+0.4	+4.5	+8.9	+11.6	+13.8	+21.9	+25.0							
21.0	744	-10.0	-9.5	-7.0	-5.6	-2.9	-0.2	+3.4	+6.8	+8.7	+10.5	+14.9	+22.0							
22.0	744	-18.0	-15.9	-8.7	-7.1	-5.9	-3.5	-0.3	+3.0	+5.5	+7.6	+10.5	+17.9	+25.0						
23.0	744	-18.0	-14.9	-10.8	-8.0	-5.9	-3.7	-0.6	+2.3	+5.4	+7.4	+9.5	+14.9	+20.0						
24.0	744	-20.0	-19.9	-12.5	-8.8	-6.7	-4.0	-0.7	+2.3	+5.1	+7.5	+10.1	+15.9	+17.0						
25.0	744	-13.0	-12.9	-11.0	-9.1	-7.6	-4.0	-0.6	+2.4	+5.4	+7.2	+8.7	+10.9	+13.0						
26.0	744	-13.0	-12.9	-10.5	-8.7	-7.2	-4.0	-0.6	+2.8	+5.9	+7.2	+9.1	+10.9	+13.0						
27.0	744	-18.0	-16.9	-13.2	-10.2	-7.6	-3.9	-0.5	+2.9	+6.2	+8.0	+9.8	+11.9	+15.0						
28.0	83	-4.4	-5.0	-3.8	-2.8	-0.7	+1.6	+4.5	+10.5	+12.0	+14.1	+14.0	+15.0							
29.0	93	-0.3	-3.0	-2.7	-0.6	+0.8	+2.7	+10.0	+11.6	+13.1	+14.1	+14.3								
30.0	97	-11.5	-6.9	-2.6	-0.1	+5.0	+0.2	+10.4	+11.0	+13.0	+14.1	+14.2								
31.0	94	-14.0	-5.4	-3.4	-0.3	+4.0	+0.2	+10.2	+12.4	+13.8	+14.7	+15.3	+15.4							
32.0	101	-16.7	-8.0	-6.7	-5.3	-1.0	+4.6	+9.7	+15.1	+17.7	+18.3	+18.6	+18.6							
33.0	103	-17.8	-8.0	-6.0	-2.3	+3.8	+0.3	+13.6	+15.4	+17.0	+17.6	+17.8	+17.8							
34.0	103	-18.0	-9.0	-6.7	-5.3	-2.0	+3.4	+9.6	+13.4	+18.0	+18.0	+18.4	+18.9							
35.0	103	-14.7	-17.0	-14.5	-8.3	-3.2	+3.1	+4.1	+10.9	+11.0	+12.0	+23.5	+23.6							
36.0	104	-16.5	-16.4	-11.5	-6.5	-3.5	+2.0	+9.0	+12.1	+17.4	+18.0	+24.6	+24.7							
37.0	113	-18.0	-15.0	-14.4	-7.9	-2.8	+3.2	+8.1	+13.7	+21.4	+22.0	+23.6	+23.7							
38.0	113	-21.6	-18.0	-16.4	-8.3	-3.8	+1.1	+8.0	+16.2	+19.0	+21.0	+24.1	+24.3							
39.0	114	-25.1	-20.0	-16.4	-9.3	-3.0	+3.6	+0.4	+15.1	+17.7	+21.0	+24.5	+24.6							
40.0	116	-27.7	-17.8	-11.7	-9.6	-3.5	+3.3	+10.5	+16.0	+18.0	+19.8	+31.5	+31.5							
41.0	116	-28.8	-28.8	-15.4	-11.2	-4.5	+3.8	+10.7	+16.2	+22.0	+23.8	+36.8	+37.0							
42.0	116	-26.7	-17.8	-13.4	-9.2	-3.0	+4.7	+11.1	+16.7	+23.0	+24.8	+42.2	+42.4							
43.0	116	-23.6	-10.0	-7.4	-5.8	-2.7	+5.0	+13.5	+21.2	+27.0	+28.0	+41.8	+42.0							
44.0	113	-19.8	-9.0	-5.7	-4.2	-1.4	+6.9	+14.3	+21.4	+23.0	+33.0	+37.4	+37.6							
45.0	111	-15.9	-9.0	-8.4	-3.4	-0.4	+7.4	+17.1	+22.4	+24.4	+31.0	+33.1	+33.3							
46.0	110	-13.7	-12.0	-7.5	-1.9	+2.2	+8.1	+14.1	+23.4	+27.0	+28.0	+33.5	+33.5							
47.0	104	-0.5	-8.0	-7.1	-3.6	-3.5	+10.7	+10.9	+26.6	+29.0	+30.0	+34.0	+35.0							
48.0	107	-10.9	-9.0	-8.1	-0.8	+5.0	+11.5	+10.6	+26.7	+31.1	+32.0	+34.7	+35.4							
49.0	105	-13.2	-10.9	-9.6	-3.7	-4.7	+12.6	+21.1	+27.8	+33.4	+35.0	+35.7	+35.8							
50.0	102	-11.8	-10.0	-7.0	-4.9	+5.2	+13.1	+21.8	+28.4	+31.7	+33.0	+35.5	+35.6							
51.0	97	-11.6	-6.0	-3.1	-3.8	-1.4	+14.4	+23.6	+30.4	+31.0	+35.0	+36.0	+36.1							
52.0	94	-15.9	-5.6	-4.1	-4.1	+1.0	+15.0	+22.7	+31.7	+32.0	+42.1	+42.0	+43.0							
53.0	87	-14.7	-11.0	-3.8	-2.8	+2.8	+12.6	+20.8	+30.1	+35.0	+36.1	+36.7	+36.8							
54.0	80	-21.4	-11.2	-11.2	-7.0	+1.0	+12.8	+20.2	+27.0	+28.0	+32.2	+32.4	+32.0							
55.0	69	-24.2	-13.4	-6.5	-2.5	+13.5	+20.0	+25.4	+31.1	+31.4	+31.4	+31.6	+31.6							
56.0	60	-13.2	-0.6	-0.6	+6.2	+14.5	+20.5	+26.5	+31.4	+32.5	+33.2	+33.3								
57.0	51	-4.8	-4.8	-2.4	-2.4	+9.0	+16.8	+23.0	+29.5	+30.4	+31.1	+31.4	+31.5							
58.0	41	-11.2	-4.9	-0.6	+0.6	+10.5	+25.5	+29.0	+32.0	+32.0	+32.5	+32.5								
59.0	32	-7.7	+9.2	+12.5	+20.0	+30.9	+38.4	+45.1	+45.1	+45.8	+45.1	+46.2								
60.0	22	+5	+14.1	+16.4	+23.0	+38.1	+39.0	+51.4	+52.0	+52.0	+52.0	+52.2								
61.0	14	+7.5	+13.2	+21.0	+31.0	+40.2	+40.2	+40.2	+40.2	+40.2	+40.2	+40.2								
62.0	10	+7.7	+14.6	+23.0	+38.0	+47.1	+47.1	+47.1	+47.1	+47.1	+47.1	+47.1								
63.0	7	+11.9	+16.8	+26.0	+35.0	+46.5	+46.5	+46.5	+46.5	+46.5	+46.5	+46.9								
64.0	5	+14.4	+21.5	+50.1	+50.4	+50.4	+50.4	+50.4	+50.4	+50.4	+50.4	+50.5								
65.0	3	+7.6	+14.5	+19.7	+20.1	+20.2	+20.2	+20.2	+20.2	+20.2	+20.2	+20.3								
66.0	2	-5.0	-5.0	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4	+1.4								
67.0	1	+14.7																		
68.0	1	+4.3																		
69.0	1	+0.2																		
70.0	1	-5.5																		

DATA SOURCE										APRIL						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
5FC	720	-11.0			-7.8	-6.8		-5.3	-2.6	-0.3	+1.8	+3.8	+4.9	+6.4	+11.0	+12.0
10	720	-18.0			-10.9	-8.8		-7.2	-3.6	+0.3	+5.0	+8.7	+13.1	+16.4	+18.7	+19.0
20	720	-18.0			-11.3	-8.8		-6.8	-3.9	-0.1	+4.9	+9.8	+13.7	+16.2	+19.0	+20.0
30	720	-22.0			-14.8	-11.6	-9.1	-6.6	-0.2	+5.2	+12.0	+14.3	+16.9	+25.0	+26.0	
40	720	-25.0			-16.3	-13.6	-10.0	-5.0	-0.1	+6.5	+12.1	+15.5	+18.8	+28.0	+29.0	
50	720	-25.0			-14.2	-12.1	-9.5	-4.9	+0.0	+7.1	+13.1	+18.3	+21.8	+31.0	+32.0	
60	720	-30.0			-13.9	-12.6	-10.1	-5.1	+0.2	+8.5	+16.0	+20.2	+23.9	+28.0	+29.0	
70	720	-26.0			-14.9	-13.1	-10.5	-6.1	+0.6	+9.7	+16.8	+22.6	+27.9	+31.0	+32.0	
80	720	-30.0			-15.8	-14.6	-11.8	-6.6	+1.2	+10.1	+18.8	+24.1	+31.8	+35.6	+36.0	
90	720	-26.0			-19.9	-16.6	-14.0	-7.9	+1.7	+12.4	+21.6	+27.5	+32.9	+42.0	+43.0	
100	720	-40.0			-24.8	-21.4	-16.8	-9.3	+1.6	+15.0	+25.7	+29.7	+33.8	+46.5	+47.0	
110	720	-45.0			-29.8	-24.4	-18.5	-10.1	+1.7	+17.1	+28.2	+32.2	+36.9	+53.0	+54.0	
120	720	-50.0			-32.8	-25.5	-21.1	-10.4	+1.9	+18.9	+28.7	+33.5	+38.9	+54.5	+55.0	
130	720	-47.0			-29.9	-23.7	-19.2	-9.7	+2.4	+17.7	+28.5	+33.5	+38.9	+47.0	+48.0	
140	720	-36.0			-26.3	-21.9	-15.6	-8.2	+2.6	+16.2	+24.7	+30.1	+31.9	+40.0	+41.0	
150	720	-23.0			-19.3	-17.8	-13.0	-6.0	+2.6	+13.9	+19.5	+24.1	+27.4	+34.5	+35.0	
160	720	-22.0			-16.1	-13.1	-10.5	-5.5	+1.7	+10.6	+16.6	+20.3	+24.9	+32.0	+33.0	
170	720	-18.0			-14.5	-11.6	-9.6	-5.4	+1.1	+8.0	+13.8	+18.1	+22.6	+30.0	+31.0	
180	720	-19.0			-12.9	-10.8	-8.6	-5.0	+0.0	+5.3	+10.6	+13.1	+16.2	+20.5	+21.0	
190	720	-15.0			-11.4	-9.2	-7.3	-4.7	+0.4	+3.6	+7.7	+10.3	+15.4	+26.0	+27.0	
200	720	-19.0			-10.4	-9.1	-7.4	-4.6	+0.7	+2.7	+6.0	+8.2	+11.6	+17.5	+18.0	
210	720	-14.0			-9.9	-8.2	-6.8	-4.8	-1.0	+1.5	+4.1	+5.4	+7.7	+12.0	+13.0	
220	720	-13.0			-8.4	-7.4	-6.5	-4.5	-1.4	+1.2	+3.5	+4.6	+6.4	+10.0	+11.0	
230	720	-13.0			-9.1	-8.0	-6.8	-4.5	-1.5	+0.8	+2.9	+4.1	+5.4	+7.0	+8.0	
240	720	-13.0			-9.9	-8.2	-6.6	-4.8	-1.6	+1.0	+3.5	+4.4	+6.4	+12.0	+13.0	
250	720	-12.0			-9.9	-9.0	-7.1	-4.9	-1.5	+1.0	+3.7	+5.5	+6.6	+8.5	+9.0	
260	720	-13.0			-10.1	-9.0	-7.2	-4.8	-1.2	+1.0	+3.7	+5.3	+6.9	+9.5	+10.0	
270	720	-13.0			-10.2	-9.0	-7.5	-4.7	-0.9	+1.5	+4.0	+5.6	+7.4	+9.6	+10.0	
280	94	-11.7			-6.0	-6.0	-5.0	-3.6	0.5	4.8	8.1	10.6	13.0	13.6	13.7	
290	94	-6.8			-6.6	-6.4	-5.4	-3.3	1.7	5.8	8.4	9.7	12.0	13.2	13.4	
300	103	-4.2			-6.0	-6.0	-5.0	-3.3	2.0	6.0	10.0	10.0	13.0	15.2	15.4	
310	107	-9.5			-9.0	-7.6	-6.9	-3.1	2.5	5.7	10.7	12.5	13.0	14.2	14.4	
320	104	-9.0			-8.4	-6.6	-6.6	-4.0	1.4	7.2	9.0	10.0	11.4	11.4	11.9	
330	104	-11.5			-11.5	-9.5	-8.6	-4.6	1.3	9.0	9.0	12.4	13.5	14.1	14.2	
340	104	-13.9			-13.5	-13.5	-8.6	-5.7	1.3	6.4	9.0	11.4	14.0	14.0	14.0	
350	110	-19.8			-14.0	-13.5	-10.7	-5.4	0.4	6.4	9.4	11.2	12.0	12.7	12.9	
360	112	-22.1			-16.0	-14.7	-11.2	-7.1	1.1	6.0	7.7	10.2	10.0	11.4	11.9	
370	112	-23.1			-20.0	-16.6	-11.4	-7.0	1.2	5.7	8.1	9.4	10.0	12.0	13.1	
380	114	-24.0			-17.0	-16.4	-12.3	-7.0	0.0	5.7	10.3	11.2	11.0	15.1	15.3	
390	112	-24.4			-13.0	-13.2	-11.4	-7.1	1.4	7.4	11.0	14.2	14.0	15.7	15.4	
400	112	-22.9			-11.0	-10.4	-9.9	-7.3	0.5	7.4	11.5	12.4	13.0	14.0	14.2	
410	113	-20.5			-12.0	-10.4	-8.8	-5.9	1.2	6.4	12.7	16.5	17.0	20.0	20.2	
420	112	-19.3			-12.0	-11.7	-8.8	-4.9	0.5	5.9	12.2	14.4	19.0	20.0	21.1	
430	112	-21.7			-17.0	-12.5	-7.8	-5.0	1.7	5.1	13.2	19.2	19.0	25.5	25.6	
440	111	-15.1			-17.0	-13.5	-9.4	-5.4	2.6	9.8	17.9	21.4	24.0	29.1	29.3	
450	110	-14.3			-13.0	-12.6	-9.2	-3.4	3.4	11.4	15.5	21.4	25.0	31.1	31.3	
460	107	-14.5			-12.0	-11.4	-8.4	-2.7	4.1	13.2	21.7	27.0	28.0	32.1	32.3	
470	105	-14.0			-12.0	-11.6	-9.4	-3.4	4.0	12.3	22.4	25.4	27.0	31.4	32.1	
480	103	-14.7			-14.0	-10.8	-8.6	-3.6	4.4	13.2	21.9	23.7	32.0	33.0	33.1	
490	103	-16.7			-13.4	-10.8	-8.4	-3.0	4.3	11.7	19.9	24.7	27.0	28.6	28.7	
500	100	-10.4			-10.0	-8.9	-7.0	-2.8	3.7	11.0	21.0	24.7	27.7	24.4	24.5	
510	100	-9.0			-9.0	-8.4	-6.0	-1.9	4.0	12.4	22.5	25.4	26.0	24.0	24.1	
520	94	-14.7			-7.8	-5.5	-4.4	-1.4	4.8	12.5	18.1	22.4	24.0	24.4	24.4	
530	92	-10.9			-8.5	-7.2	-5.0	-1.4	5.2	12.5	20.0	23.4	24.0	24.4	24.4	
540	80	-9.0			-6.7	-6.0	-4.0	-0.5	5.4	14.2	21.0	22.9	29.1	29.5	29.5	
550	75	-10.7			-8.4	-6.2	-4.0	-2.3	4.8	15.6	22.1	23.4	32.1	32.5	32.6	
560	63	-9.1			-6.4	-5.6	-4.0	-1.5	5.5	14.0	24.4	24.4	31.5	32.2	32.3	
570	52	-10.8			-9.7	-8.4	-6.0	-2.4	4.0	16.9	24.4	27.4	30.5	31.1	31.2	
580	44	-15.5			-13.0	-11.8	-9.4	-5.4	4.3	20.4	25.7	34.0	34.7	34.1	34.2	
590	35	-13.3			-10.2	-8.4	-6.4	-4.4	4.4	14.4	26.3	34.4	34.0	35.3	35.4	
600	24	-17.0			-11.7	-9.0	-6.4	-4.4	4.4	17.4	26.4	34.4	34.0	34.4	34.4	
610	14	-15.1			-11.7	-9.0	-6.4	-4.4	4.4	17.4	26.4	34.4	34.0	34.4	34.4	
620	4	-0.4			-0.3	-0.3	-0.3	-0.3	11.0	22.7	33.4	33.4	33.7	33.7	33.7	
630	4	10.7			-0.3	-0.3	-0.3	-0.3	13.0	40.4	40.7	40.0	40.4	40.0	40.4	
640	4	-23.5			-0.3	-0.3	-0.3	-0.3	13.0	40.4	40.7	40.0	40.4	40.0	40.4	
650	2	-16.8			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	
660	2	-11.5			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	
670	2	-3.8			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	
680	2	-19.3			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	
690	2	-17.8			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	
700	2	-22.9			-0.3	-0.3	-0.3	-0.3	17.0	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE										MAY						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28°14' N	80°36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28°29' N	80°33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-8.0			-6.9	-5.5	-4.2	-2.1	-0.4	+1.5	+3.2	+3.8	+4.6	+5.9	+9.0	
1.0	744	-15.0		-14.9	-10.8	-8.2	-6.6	-3.5	-0.2	+3.9	+6.5	+7.9	+9.9	+14.9	+17.0	
2.0	744	-19.0		-16.9	-12.2	-10.0	-7.9	-4.7	-0.6	+3.6	+6.9	+9.4	+12.1	+14.9	+19.0	
3.0	744	-18.0		-17.9	-12.6	-10.0	-7.8	-4.7	-0.6	+3.6	+8.4	+12.6	+14.7	+17.9	+21.0	
4.0	744	-20.0		-17.9	-12.2	-10.4	-8.4	-5.3	-0.5	+4.3	+9.4	+13.7	+17.2	+21.9	+23.0	
5.0	744	-16.0			-13.5	-11.6	-8.7	-5.7	-0.3	+5.3	+10.1	+14.0	+17.5	+23.4	+24.0	
6.0	744	-17.0		-16.9	-14.1	-13.1	-10.5	-5.9	-0.2	+6.5	+11.7	+15.5	+19.5	+26.9	+31.0	
7.0	744	-18.0			-16.1	-14.8	-11.7	-6.4	+0.1	+7.3	+13.4	+18.0	+24.5	+34.4	+35.0	
8.0	744	-21.0			-19.1	-16.2	-13.1	-6.9	+0.5	+8.8	+15.9	+20.0	+26.5	+34.9	+40.0	
9.0	744	-25.0		-24.9	-22.2	-17.8	-15.1	-8.2	+0.6	+11.0	+18.4	+24.0	+27.8	+40.9	+48.0	
10.0	744	-30.0		-29.9	-24.8	-20.6	-17.6	-9.1	+0.5	+13.1	+21.7	+29.4	+34.5	+43.9	+50.0	
11.0	744	-33.0		-32.9	-29.8	-24.3	-19.0	-10.6	+0.7	+14.9	+26.5	+32.6	+39.5	+47.9	+52.0	
12.0	744	-41.0		-39.9	-32.5	-27.0	-20.3	-11.3	+1.1	+16.0	+29.4	+34.2	+41.7	+54.9	+57.0	
13.0	744	-44.0		-42.9	-33.5	-25.5	-21.4	-12.6	+0.7	+16.1	+28.6	+32.2	+35.7	+48.9	+53.0	
14.0	744	-43.0		-35.9	-30.7	-23.0	-18.5	-10.8	+0.4	+13.1	+23.6	+27.8	+31.7	+49.9	+52.0	
15.0	744	-29.0		-27.9	-22.7	-18.5	-15.5	-9.7	+0.4	+10.8	+17.4	+21.0	+24.7	+34.4	+35.0	
16.0	744	-20.0			-18.4	-16.5	-12.7	-8.5	+0.7	+7.8	+12.6	+15.4	+18.2	+21.6	+22.0	
17.0	744	-17.0		-16.9	-15.2	-13.3	-11.6	-8.1	+1.2	+4.7	+9.1	+11.0	+12.5	+16.4	+17.0	
18.0	744	-17.0		-13.9	-11.9	-10.9	-9.8	-6.8	+1.5	+2.6	+5.2	+7.3	+10.5	+14.9	+16.0	
19.0	744	-18.0		-13.9	-10.1	-9.2	-7.9	-5.5	+1.4	+1.3	+3.6	+4.8	+5.9	+8.9	+14.0	
20.0	744	-13.0		-11.9	-9.8	-8.3	-7.2	-5.2	+1.8	+0.3	+2.2	+3.6	+5.5	+6.9	+8.0	
21.0	744	-11.0		-10.9	-7.8	-7.2	-6.5	-4.6	+1.8	+0.0	+2.1	+3.0	+4.0	+5.4	+6.0	
22.0	744	-10.0			-8.7	-7.6	-6.7	-4.9	+2.0	+0.2	+1.5	+3.1	+4.5	+8.9	+11.0	
23.0	744	-9.0			-8.3	-7.6	-6.7	-4.9	+2.1	+0.1	+1.5	+2.6	+3.5	+8.9	+14.0	
24.0	744	-11.0			-9.3	-8.1	-6.8	-5.2	+2.2	+0.1	+1.8	+3.2	+4.3	+5.9	+12.0	
25.0	744	-13.0			-9.9	-8.6	-7.3	-5.5	+2.5	+0.0	+2.1	+3.0	+4.4	+6.4	+7.0	
26.0	744	-16.0			-10.9	-9.0	-7.3	-5.4	+2.3	+0.1	+1.9	+3.1	+4.1	+7.4	+8.0	
27.0	744	-14.0			-10.5	-9.2	-8.0	-5.5	+2.4	+0.0	+1.8	+2.8	+4.1	+4.4	+7.0	
28.0	103	-9.3			-7.0	-7.0	-4.0	-4.0	+1.7	+2.1	+4.0	+4.7	+5.0	+5.5	+5.5	
29.0	105	-10.0			-8.0	-7.0	-7.2	-4.0	+1.2	+2.4	+5.5	+6.5	+7.0	+8.0	+8.2	
30.0	105	-9.1				-8.4	-7.7	-5.3	+0.7	+3.3	+6.5	+8.3	+9.0	+14.0	+14.4	
31.0	107	-11.8			-10.0	-9.4	-7.9	-5.6	+0.9	+3.5	+5.5	+9.3	+10.0	+12.0	+12.4	
32.0	110	-10.1				-9.2	-8.0	-5.4	+0.4	+3.5	+7.4	+8.2	+9.0	+11.5	+11.5	
33.0	112	-16.1			-12.0	-11.5	-10.0	-6.1	+0.9	+2.9	+7.4	+10.5	+12.0	+20.0	+20.5	
34.0	113	-12.4				-10.4	-9.5	-6.3	+1.3	+2.6	+7.7	+9.7	+10.0	+12.0	+13.1	
35.0	113	-14.1			-12.0	-11.4	-9.8	-7.0	+1.5	+3.5	+8.3	+9.0	+10.4	+10.4	+10.4	
36.0	113	-11.9				-11.7	-9.8	-6.6	+1.8	+3.5	+6.7	+8.7	+10.0	+11.5	+11.5	
37.0	114	-21.7			-12.0	-11.7	-9.4	-6.4	+1.0	+2.6	+7.3	+10.0	+10.0	+11.4	+11.4	
38.0	112	-11.3			-10.0	-9.7	-8.7	-7.2	+1.7	+2.4	+6.5	+8.7	+9.9	+12.4	+12.4	
39.0	112	-15.6			-14.0	-10.4	-8.0	-6.5	+2.6	+2.5	+5.2	+7.5	+8.4	+22.6	+22.7	
40.0	115	-14.7			-14.7	-14.5	-10.7	-6.0	+3.2	+1.6	+4.1	+5.7	+6.9	+18.4	+19.0	
41.0	116	-22.0			-14.8	-16.4	-11.6	-7.0	+3.1	+1.5	+4.4	+7.9	+7.9	+12.4	+12.5	
42.0	116	-10.8			-10.4	-10.8	-9.0	-7.5	+3.2	+2.2	+5.2	+11.4	+14.4	+17.6	+17.7	
43.0	113	-12.6			-12.6	-12.2	-11.1	-7.0	+3.0	+2.0	+6.4	+14.0	+18.0	+24.8	+25.0	
44.0	112	-14.2			-14.0	-13.5	-11.5	-7.1	+2.5	+3.3	+6.1	+7.5	+11.6	+12.0	+12.3	
45.0	111	-15.5				-11.4	-8.1	-1.6	+1.6	+4.4	+7.2	+8.7	+10.0	+19.1	+19.2	
46.0	104	-14.9			-15.0	-14.5	-12.0	-7.0	+1.0	+4.5	+8.0	+10.5	+12.0	+15.5	+15.7	
47.0	107	-25.4			-15.0	-14.0	-13.6	-7.0	+0.2	+5.5	+8.0	+13.4	+15.0	+17.7	+18.0	
48.0	106	-25.8			-24.0	-18.4	-14.7	-7.4	+0.5	+4.5	+9.7	+12.4	+13.0	+19.3	+19.5	
49.0	104	-29.1			-27.0	-23.6	-14.6	-8.7	+0.6	+4.4	+9.4	+11.5	+12.0	+12.0	+12.3	
50.0	100	-29.1			-29.0	-19.7	-15.0	-8.6	+0.1	+5.3	+9.0	+11.4	+12.0	+14.0	+14.3	
51.0	98	-26.7				-19.4	-17.1	-8.5	+0.7	+5.1	+9.1	+12.4	+15.0	+15.7	+15.8	
52.0	95	-24.9				-19.4	-18.1	-10.6	+0.9	+5.0	+10.5	+11.0	+16.0	+16.4	+16.9	
53.0	90	-25.6				-22.5	-18.2	-9.0	+0.7	+6.4	+11.5	+13.5	+15.1	+16.1	+16.2	
54.0	85	-25.7				-23.1	-14.0	-8.2	+1.1	+6.4	+12.0	+12.4	+31.1	+31.7	+31.7	
55.0	74	-36.7				-27.3	-14.3	-10.3	+1.1	+7.1	+9.4	+13.4	+15.2	+15.4	+15.6	
56.0	56	-34.3				-25.5	-16.4	-11.3	+1.7	+6.4	+12.4	+17.5	+19.3	+19.4	+19.4	
57.0	57	-53.1				-23.7	-21.1	-10.0	+1.5	+7.0	+14.0	+16.7	+20.5	+21.3	+21.5	
58.0	43	-40.6				-24.4	-13.1	-9.4	+2.4	+9.4	+15.0	+17.0	+17.4	+14.3	+14.4	
59.0	33	-24.3				-27.3	-15.0	-9.5	+0.5	+4.4	+13.4	+17.1	+17.4	+17.5	+17.5	
60.0	20	-26.3				-16.4	-11.0	-1.0	+4.0	+20.0	+25.4	+25.0	+26.1	+26.1	+26.2	
61.0	12	-24.7				-17.1	-6.0	-1.1	+4.0	+12.1	+17.5	+17.0	+18.1	+18.2	+18.2	
62.0	9	-30.2				-16.4	-4.5	-0.4	+4.5	+0.4	+1.5	+1.0	+2.0	+2.1	+2.2	
63.0	2	-14.7						-15.0	-10.0	-9.7	-9.4	-9.4	-9.4	-9.5	-9.5	
64.0	2	-21.9						-22.0	-10.4	-10.2	-10.0	-10.0	-10.1	-10.1	-10.1	
65.0	2	-24.1						-29.0	-11.1	-10.9	-10.8	-10.8	-10.8	-10.7	-10.7	
66.0	1	-33.9													-33.9	
67.0	1	-12.7													-12.7	
68.0	1	-13.7													-13.7	
69.0	1	-4.0													-4.0	
70.0	1	2.2													2.2	

DATA SOURCE										JUNE						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE	PERCENTAGE	FREQUENCY	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	720	-7.0			-5.9	-4.4	-3.2	-1.5	-0.2	+1.8	+3.5	+4.5	+5.9	+10.0	+11.0	
1.0	720	-13.0			-7.6	-5.9	-5.0	-2.2	+0.8	+4.5	+7.3	+10.3	+11.9	+18.0	+19.0	
2.0	720	-10.0			-6.9	-5.9	-4.9	-2.6	+0.2	+4.1	+7.3	+9.8	+12.9	+21.0	+22.0	
3.0	720	-12.0			-7.3	-6.1	-4.7	-2.5	+0.1	+4.0	+7.2	+9.7	+14.2	+21.0	+22.0	
4.0	720	-11.0			-7.3	-6.3	-4.7	-2.5	+0.0	+4.0	+7.6	+11.4	+12.9	+23.5	+24.0	
5.0	720	-13.0			-7.4	-6.4	-5.3	-2.9	+0.1	+3.9	+7.3	+11.5	+12.8	+24.0	+25.0	
6.0	720	-13.0			-8.4	-7.1	-6.0	-3.7	+0.3	+4.2	+8.3	+11.2	+13.6	+24.0	+25.0	
7.0	720	-13.0			-9.5	-8.2	-6.7	-4.0	+0.3	+4.6	+9.1	+11.8	+15.8	+25.0	+26.0	
8.0	720	-14.0			-10.9	-10.0	-8.4	-5.0	+0.3	+5.5	+9.9	+13.3	+16.8	+24.0	+25.0	
9.0	720	-18.0			-13.7	-12.3	-10.5	-6.0	+0.2	+7.1	+12.0	+14.7	+19.2	+24.0	+25.0	
10.0	720	-21.0			-16.9	-15.4	-13.0	-7.2	+0.2	+8.2	+14.5	+18.7	+22.9	+28.5	+29.0	
11.0	720	-26.0			-20.8	-18.3	-14.7	-8.9	+0.3	+9.0	+17.1	+21.7	+24.9	+40.0	+41.0	
12.0	720	-38.0			-25.3	-21.4	-17.7	-11.4	+0.7	+10.9	+19.0	+24.5	+28.9	+44.0	+45.0	
13.0	720	-36.0			-28.2	-23.3	-19.2	-12.3	+1.5	+9.7	+19.4	+24.7	+29.9	+46.0	+47.0	
14.0	720	-39.0			-26.7	-21.9	-19.3	-11.8	+3.0	+6.3	+15.6	+20.4	+22.9	+33.5	+34.0	
15.0	720	-25.0			-21.7	-20.1	-16.4	-11.2	+4.0	+2.8	+8.5	+12.8	+15.8	+21.0	+22.0	
16.0	720	-21.0			-16.9	-15.5	-12.3	-9.4	+4.0	+0.7	+4.4	+8.1	+10.8	+13.0	+14.0	
17.0	720	-19.0			-14.3	-12.1	-9.9	-7.4	+3.3	+0.0	+2.8	+4.5	+6.2	+10.0	+11.0	
18.0	720	-16.0			-11.2	-9.7	-8.9	-6.4	+3.1	+0.4	+1.6	+2.9	+3.7	+5.5	+6.0	
19.0	720	-18.0			-9.9	-9.0	-7.7	-5.8	+2.9	+0.4	+0.9	+2.3	+3.4	+4.8	+5.0	
20.0	720	-15.0			-10.5	-9.1	-8.0	-5.9	+3.1	+0.5	+0.4	+1.4	+2.5	+4.0	+4.0	
21.0	720	-15.0			-9.7	-8.7	-7.6	-5.8	+3.2	+0.7	+0.0	+0.8	+1.9	+3.5	+4.0	
22.0	720	-15.0			-11.3	-9.7	-8.5	-6.3	+3.2	+0.6	+0.4	+1.2	+1.8	+4.0	+5.0	
23.0	720	-15.0			-10.9	-9.7	-8.7	-6.6	+3.5	+0.8	+0.1	+1.0	+1.9	+4.0	+5.0	
24.0	720	-14.0			-11.2	-9.6	-8.5	-6.5	+3.7	+1.1	+0.1	+0.6	+1.6	+5.0	+6.0	
25.0	720	-13.0			-11.2	-10.3	-9.0	-7.0	+4.1	+1.4	+0.2	+0.3	+1.1	+3.0	+4.0	
26.0	720	-13.0			-11.4	-10.5	-9.3	-7.3	+4.4	+1.3	+0.1	+0.7	+1.9	+4.0	+5.0	
27.0	720	-14.0			-11.8	-10.9	-9.4	-7.6	+4.4	+1.5	+0.3	+0.2	+1.7	+3.0	+4.0	
28.0	103	-11.2			-11.0	-10.3	-9.3	-7.1	+4.8	+1.1	0.6	1.4	2.0	4.2	4.8	
29.0	104	-16.2			-12.0	-10.4	-7.6	-6.1	+4.1	+1.4	0.4	1.4	2.0	4.4	5.0	
30.0	107	-12.3			-10.4	-9.2	-8.5	-6.6	+3.4	+0.7	0.0	2.7	2.0	3.4	3.5	
31.0	108	-12.1			-10.5	-9.4	-8.6	-6.7	+2.9	+0.4	1.0	2.4	3.0	3.8	3.9	
32.0	109	-13.7			-13.7	-12.5	-10.7	-7.0	+2.8	0.6	2.3	4.4	6.0	7.5	7.5	
33.0	109	-12.0			-11.0	-10.5	-9.7	-7.2	+3.4	+0.2	1.3	3.4	4.0	5.7	5.9	
34.0	110	-13.1			-11.0	-11.2	-9.0	-7.2	+4.1	+0.3	1.0	3.4	4.0	5.8	6.0	
35.0	111	-19.7			-13.0	-12.0	-12.1	-8.4	+0.4	+0.2	1.4	2.4	3.0	3.8	3.9	
36.0	111	-14.2			-13.0	-13.2	-12.1	-9.4	+4.6	+1.1	3.2	4.4	5.4	6.0	6.1	
37.0	110	-15.5			-14.0	-13.7	-12.2	-10.3	+4.7	+0.7	1.5	5.2	5.4	8.1	9.3	
38.0	110	-15.4			-14.0	-13.4	-12.0	-10.6	+6.1	0.1	2.3	4.2	4.0	6.4	6.7	
39.0	110	-17.2			-16.0	-15.4	-14.2	-10.8	+5.4	+0.3	1.4	2.0	4.4	5.2	5.3	
40.0	110	-22.3			-14.0	-17.5	-15.6	-12.1	+7.0	+1.5	0.7	3.2	3.0	5.1	5.3	
41.0	110	-22.9			-21.0	-20.5	-16.0	-14.0	+7.2	+2.0	0.4	2.2	2.0	3.7	3.4	
42.0	109	-20.8			-20.8	-18.5	-16.6	-13.2	+7.9	+3.5	+0.4	0.4	1.0	2.9	3.1	
43.0	109	-19.5			-19.0	-18.3	-16.4	-13.1	+7.6	+3.1	+0.1	0.4	1.4	2.2	2.3	
44.0	109	-20.3			-19.0	-16.8	-15.3	-12.0	+6.0	+2.7	1.4	3.4	7.0	10.5	10.6	
45.0	109	-20.9			-20.8	-17.4	-15.0	-12.3	+6.0	+1.1	3.3	5.4	7.0	9.7	9.4	
46.0	108	-26.7			-20.0	-18.4	-15.0	-12.3	+5.8	+0.2	4.5	5.4	6.0	10.5	10.6	
47.0	107	-21.4			-20.0	-19.4	-16.4	-11.0	+5.1	1.0	3.5	5.4	10.0	21.7	21.8	
48.0	101	-22.4			-20.7	-19.3	-11.0	-4.3	+2.3	6.0	8.0	11.0	12.7	12.8		
49.0	100	-35.6			-21.7	-17.0	-11.5	+3.4	+1.1	8.4	4.0	10.0	10.0	16.2	16.4	
50.0	92	-31.8			-19.0	-17.4	-11.7	+3.4	+1.1	5.1	7.4	9.0	14.1	14.7	14.4	
51.0	89	-23.6			-22.0	-17.5	-11.3	+3.1	+1.1	4.1	4.2	9.0	11.1	12.1	12.3	
52.0	80	-24.9			-21.2	-16.7	-11.4	+4.0	+2.3	6.0	4.2	10.1	10.6	10.7		
53.0	75	-26.9			-19.3	-18.4	-12.2	+4.4	+1.5	6.3	7.4	9.2	9.6	9.7		
54.0	73	-33.2			-22.7	-19.3	-14.3	+5.0	+1.5	5.7	7.4	8.4	9.3	9.4		
55.0	70	-37.4			-23.4	-20.3	-14.0	+4.2	+1.4	7.4	8.7	12.3	13.0	13.2		
56.0	66	-36.8			-24.7	-22.7	-16.3	+7.7	+1.2	6.7	14.4	20.4	21.3	21.4		
57.0	62	-34.3			-24.4	-20.9	-15.4	+7.5	+2.2	8.0	13.4	13.4	19.1	14.1		
58.0	52	-35.8			-30.4	-22.4	-18.4	+4.5	+2.7	10.4	12.0	23.4	23.4	23.4		
59.0	40	-32.0			-30.0	-20.7	-20.7	+0.2	+1.4	4.0	5.1	5.4	6.3	6.4		
60.0	31	-28.7			-24.4	-24.4	-24.4	+1.5	+1.0	13.4	34.4	34.4	35.1	35.2		
61.0	23	-24.1			-22.4	-22.4	-22.4	+1.2	+0.6	0.9	15.2	15.4	15.4	15.5		
62.0	14	-34.0			-24.4	-13.0	-13.0	+6.1	+3.2	3.4	3.4	3.7	3.8	3.8		
63.0	6	-54.3			-22.0	-22.0	-22.0	+2.1	+3.0	3.2	3.2	3.3	3.4	3.4		
64.0	2	-31.6			-32.0	-32.0	-32.0	+14.0	+17.4	-17.4	-17.4	-17.4	-17.4	-17.4		
65.0	2	-24.2			-20.0	-20.0	-20.0	+21.2	+20.0	-20.0	-20.0	-20.0	-20.0	-20.0		
66.0	1	-33.1														
67.0	1	-36.4														
68.0	1	-34.9														

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE							JULY											
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)											
				LATITUDE	LONGITUDE													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967												
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967												
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																		
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	CUMULATIVE PERCENTAGE FREQUENCY					84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC 744	-6.0			-5.9	-3.3	-2.3	-1.6	-0.7	+0.2	+1.9	+3.3	+3.9	+4.9	+6.9	+8.0			
1.0 744	-10.0			-9.9	-5.7	-3.7	-2.2	-0.5	+1.9	+4.6	+7.3	+8.9	+11.2	+23.9	+26.0			
2.0 744	-13.0			-8.9	-5.3	-4.5	-3.0	-1.0	+1.0	+4.4	+7.0	+8.6	+10.8	+20.9	+22.0			
3.0 744	-16.0				-5.5	-4.5	-3.5	-1.4	+0.8	+4.2	+7.2	+8.7	+10.1	+15.9	+20.0			
4.0 744	-19.0				-6.7	-5.1	-3.9	-1.9	+0.6	+4.4	+7.2	+8.7	+9.8	+13.9	+19.0			
5.0 744	-10.0				-7.5	-6.3	-4.9	-2.5	+0.2	+3.8	+6.7	+8.4	+10.3	+13.9	+15.0			
6.0 744	-10.0				-9.2	-7.7	-5.5	-3.0	-0.1	+3.6	+6.8	+8.7	+10.4	+14.9	+16.0			
7.0 744	-18.0				-10.1	-8.3	-6.9	-4.0	-0.3	+3.4	+6.5	+8.5	+10.2	+12.9	+15.0			
8.0 744	-23.0				-15.9	-11.1	-9.8	-8.2	-0.6	+3.3	+6.8	+8.8	+11.3	+16.4	+17.0			
9.0 744	-27.0				-18.9	-14.7	-12.2	-10.0	-0.9	+3.1	+7.9	+10.8	+13.1	+19.9	+22.0			
10.0 744	-29.0				-24.9	-16.8	-13.7	-11.3	-1.8	+3.2	+9.4	+12.5	+15.7	+20.9	+23.0			
11.0 744	-28.0				-19.7	-16.7	-13.4	-9.3	-3.1	+4.0	+10.2	+14.3	+16.8	+20.9	+22.0			
12.0 744	-32.0				-27.9	-23.5	-20.3	-16.4	-10.7	+4.2	+3.1	+9.9	+13.4	+16.8	+20.9			
13.0 744	-35.0				-29.9	-25.5	-21.6	-18.8	-12.7	+5.7	+2.2	+9.4	+13.5	+18.1	+22.9			
14.0 744	-33.0				-29.9	-21.9	-20.0	-18.1	-13.0	+6.2	+0.7	+6.2	+10.6	+15.5	+19.9			
15.0 744	-27.0				-24.9	-20.2	-17.8	-14.9	-10.9	+5.3	+0.2	+4.4	+7.3	+8.9	+12.9			
16.0 744	-19.0				-18.9	-15.7	-12.7	-11.5	-8.6	+4.3	-0.1	+2.4	+3.9	+5.1	+7.9			
17.0 744	-16.0				-14.9	-12.1	-10.6	-9.3	-7.2	+3.7	-0.5	+1.4	+3.0	+4.1	+7.9			
18.0 744	-13.0				-12.9	-9.9	-9.2	-8.0	-6.3	+3.3	-0.6	+0.5	+1.5	+2.8	+4.6			
19.0 744	-14.0				-13.9	-10.3	-9.4	-8.5	-6.6	+3.4	-0.8	-0.0	+0.8	+1.7	+4.6			
20.0 744	-17.0				-11.9	-10.3	-9.2	-8.3	-6.7	+4.0	-1.4	-0.3	-0.0	+0.6	+2.9			
21.0 744	-13.0				-12.9	-10.6	-9.7	-8.7	-6.9	+4.3	-1.4	-0.3	+0.2	+0.8	+2.9			
22.0 744	-22.0				-14.9	-11.6	-10.5	-9.3	-7.5	+4.5	-1.4	-0.0	+0.6	+1.3	+3.9			
23.0 744	-20.0				-19.9	-12.1	-10.7	-9.8	-7.9	+4.6	-1.6	-0.3	+0.4	+1.3	+5.9			
24.0 744	-17.0				-15.9	-11.9	-10.8	-9.8	-7.8	+5.1	-2.2	-0.6	+0.7	+2.9	+7.0			
25.0 744	-15.0				-14.9	-12.2	-11.4	-10.4	-8.5	+5.5	-2.6	-1.1	+0.3	+0.4	+4.9			
26.0 744	-20.0				-15.9	-12.8	-11.8	-10.7	-8.8	+5.7	-2.7	-1.1	+0.3	+3.9	+5.0			
27.0 744	-22.0				-16.9	-13.6	-12.8	-11.5	-9.3	+5.9	-2.4	-1.0	+0.2	+0.4	+3.0			
28.0 105	-15.5				-15.5	-12.0	-12.2	-10.6	-6.4	+3.4	-1.4	-1.1	0.0	1.5	1.5			
29.0 104	-14.1				-12.0	-11.4	-11.0	-9.5	-6.4	+3.0	-0.4	-0.4	0.0	0.4	1.0			
30.0 111	-15.0				-13.0	-13.2	-11.6	-9.4	-5.5	+2.7	-0.6	0.0	1.0	2.0	3.1			
31.0 112	-14.4				-13.0	-12.4	-11.8	-9.4	-5.4	+1.9	0.6	1.7	2.6	3.3	3.4			
32.0 113	-14.8				-13.0	-12.4	-10.7	-9.0	-4.7	+1.6	1.1	1.0	2.0	3.5	3.6			
33.0 117	-12.2					-11.4	-11.4	-8.4	-5.4	+1.7	0.1	1.7	5.4	7.6	7.7			
34.0 121	-20.1				-15.4	-13.2	-12.2	-10.1	-6.4	+2.4	0.5	2.1	2.0	4.0	4.2			
35.0 122	-15.6				-14.4	-13.4	-13.0	-10.4	-6.1	+2.6	0.4	2.1	2.0	7.0	8.0			
36.0 122	-16.6				-15.4	-14.2	-13.6	-10.0	-6.4	+2.4	-0.1	5.1	5.0	9.5	9.6			
37.0 122	-21.4				-17.4	-16.2	-15.4	-11.0	-7.5	+2.0	0.0	0.0	5.4	6.7	6.9			
38.0 124	-22.8				-21.4	-19.2	-16.4	-12.0	-7.1	+2.6	0.2	1.9	3.4	4.9	9.1			
39.0 125	-10.8				-19.7	-10.4	-16.9	-13.4	-7.7	+1.6	0.6	3.9	4.7	6.4	6.5			
40.0 125	-22.8				-20.7	-19.2	-17.6	-14.6	-9.5	+2.7	-0.2	1.9	4.4	5.0	5.1			
41.0 125	-23.7				-20.0	-20.4	-19.2	-15.6	-9.4	+1.4	-0.4	1.7	4.5	4.6	4.6			
42.0 124	-21.5				-20.4	-19.2	-18.0	-15.0	-10.4	+5.3	-1.6	-0.4	-0.1	5.5	5.6			
43.0 124	-20.7					-19.4	-18.4	-14.4	-11.4	+5.4	-1.4	-0.4	1.4	7.7	7.4			
44.0 122	-26.0				-23.0	-23.1	-21.4	-16.7	-11.2	+4.1	-1.0	1.6	2.4	5.4	5.5			
45.0 121	-26.9				-25.0	-25.1	-22.0	-15.0	-9.0	+2.4	2.0	3.4	4.4	4.6	4.7			
46.0 119	-24.7				-24.4	-20.7	-15.7	-9.2	+2.4	4.0	6.4	7.4	10.4	10.4	11.0			
47.0 118	-25.7				-23.0	-23.2	-18.4	-16.0	-8.1	+1.1	3.4	5.1	5.7	6.1	6.1			
48.0 117	-25.6				-25.4	-23.1	-20.6	-16.7	-7.0	+0.1	5.1	6.4	7.0	7.3	7.4			
49.0 115	-24.8				-24.0	-24.5	-20.4	-14.0	-7.0	0.2	4.4	4.4	12.9	13.5	13.6			
50.0 111	-24.0				-24.0	-23.4	-20.3	-14.0	-6.4	1.1	9.4	11.7	12.5	13.1	13.2			
51.0 110	-27.3				-25.0	-24.5	-19.5	-13.4	-6.4	-0.4	9.4	11.9	12.0	13.0	13.2			
52.0 108	-31.7				-30.4	-26.4	-22.6	-14.4	-6.5	0.9	5.9	7.4	4.3	16.4	16.9			
53.0 103	-31.7				-29.0	-27.7	-25.4	-15.4	-6.9	1.4	7.0	10.7	13.0	22.2	22.4			
54.0 97	-30.3					-27.4	-24.1	-16.4	-8.4	0.2	8.7	11.0	27.0	27.0	28.0			
55.0 84	-24.2					-27.0	-25.4	-17.4	-9.4	1.2	12.1	14.0	27.1	28.1	28.1			
56.0 84	-34.6					-31.1	-28.6	-18.7	-9.1	4.7	11.4	14.1	26.1	26.7	26.4			
57.0 77	-41.5					-31.2	-28.1	-18.4	-9.4	0.4	10.2	13.9	24.1	25.3	25.3			
58.0 66	-32.2						-24.7	-20.4	-9.4	0.4	4.9	6.4	12.4	13.1	13.2			
59.0 56	-52.1					-34.7	-27.2	-16.1	-8.4	0.1	5.1	5.0	14.4	14.9	15.0			
60.0 41	-54.7						-31.5	-15.7	-8.2	-1.3	7.0	11.1	11.7	12.1	12.2			
61.0 25	-34.4						-33.7	-27.0	-8.5	-2.2	4.4	22.4	22.4	22.4	22.4			
62.0 14	-42.8							-32.1	-14.0	4.1	27.1	27.4	24.1	24.3	24.3			
63.0 11	-44.8							-37.4	-0.4	15.1	22.7	23.1	23.1	23.5	23.5			
64.0 9	-40.3							-34.5	-1.5	13.5	15.7	16.1	16.2	16.3	16.3			
65.0 9	-36.0							-23.4	-2.5	4.4	5.4	5.4	5.4	6.0	6.0			
66.0 5	-17.0							-4.5	12.2	12.9	13.1	13.1	13.2	13.2	13.2			
67.0 4	-6.7							4.0	14.3	19.5	19.4	19.7	19.7	19.7	19.7			
68.0 5	-30.2							-4.4	6.2	6.7	6.0	6.9	7.0	7.0	7.0			
69.0 5	-21.9							-11.5	7.1	7.4	7.0	7.4	7.5	7.5	7.5			
70.0 5	-29.6							-4.4	12.1	12.5	12.4	12.4	12.4	12.4	12.5			
Positive is wind from the right (195°). Negative is wind from the left (015°).																		

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE											AUGUST					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC 744	-4.0				-3.9	-3.4	-2.7	-1.3	-0.3	+1.3	+2.6	+3.6	+4.8	+7.9	+12.0	
1.0 744	-11.0		-10.9	-7.6	-5.6	-3.7	-1.4	-0.8	+3.9	+6.6	+8.1	+10.1	+14.9	+27.0		
2.0 744	-9.0		-8.9	-7.5	-6.0	-4.3	-1.9	+0.2	+3.8	+6.4	+7.9	+9.5	+14.9	+26.0		
3.0 744	-10.0			-6.8	-5.7	-4.5	-2.3	+0.3	+3.9	+6.5	+8.4	+9.7	+16.9	+21.0		
4.0 744	-9.0		-8.9	-7.2	-6.2	-4.8	-2.2	+0.2	+4.2	+7.1	+9.5	+11.5	+15.9	+19.0		
5.0 744	-12.0			-8.3	-6.7	-5.0	-2.5	+0.1	+4.4	+7.7	+10.5	+12.8	+14.9	+18.0		
6.0 744	-15.0			-8.9	-7.2	-6.0	-3.0	+0.2	+4.1	+7.5	+10.3	+13.6	+15.9	+21.0		
7.0 744	-20.0		-16.9	-11.1	-8.7	-6.6	-4.1	+0.4	+3.9	+7.4	+10.3	+14.2	+18.9	+25.0		
8.0 744	-20.0		-18.9	-11.5	-9.9	-8.3	-5.3	+0.6	+3.7	+7.4	+10.3	+12.5	+18.9	+25.0		
9.0 744	-25.0		-20.9	-13.1	-12.1	-9.8	-6.4	+0.7	+3.5	+7.9	+11.5	+15.2	+24.9	+28.0		
10.0 744	-31.0		-28.9	-17.5	-15.0	-12.7	-7.8	+1.1	+4.3	+9.0	+13.5	+16.6	+26.9	+49.0		
11.0 744	-38.0		-31.9	-21.6	-18.0	-14.5	-9.2	+1.4	+4.8	+10.3	+14.5	+19.2	+32.9	+46.0		
12.0 744	-42.0		-38.9	-27.2	-19.5	-16.7	-10.4	+2.4	+5.4	+11.6	+16.5	+19.8	+33.9	+43.0		
13.0 744	-40.0			-25.7	-21.3	-16.8	-11.6	+3.5	+4.8	+11.3	+16.2	+21.1	+29.9	+38.0		
14.0 744	-31.0			-23.7	-19.4	-16.2	-11.0	+3.9	+2.6	+8.3	+13.0	+17.1	+21.9	+24.0		
15.0 744	-21.0		-18.9	-16.1	-13.8	-11.8	-8.5	+3.2	+1.5	+5.4	+7.8	+11.2	+14.4	+15.0		
16.0 744	-15.0		-14.9	-12.8	-11.3	-9.6	-6.5	+2.5	+0.6	+3.7	+5.3	+6.9	+8.9	+10.0		
17.0 744	-14.0		-12.9	-10.4	-9.2	-8.0	-5.6	+2.4	+0.0	+2.3	+3.3	+4.2	+6.9	+8.0		
18.0 744	-12.0		-10.9	-9.3	-8.4	-7.3	-5.5	+2.7	+0.3	+0.9	+2.5	+4.1	+7.9	+10.0		
19.0 744	-12.0			-9.9	-8.8	-7.8	-5.9	+3.3	-0.7	+0.4	+1.5	+2.3	+3.7	+4.0		
20.0 744	-14.0		-12.9	-9.9	-8.9	-7.9	-6.1	+3.7	-1.7	-0.4	-0.0	+0.6	+1.9	+3.0		
21.0 744	-16.0		-12.9	-10.9	-9.5	-8.3	-6.5	+3.9	-1.3	-0.2	+0.2	+1.3	+2.4	+3.0		
22.0 744	-12.0			-10.8	-10.2	-8.9	-7.0	+4.3	-1.6	-0.3	+0.1	+0.4	+0.6	+2.8		
23.0 744	-16.0			-11.5	-10.7	-9.6	-7.5	+4.4	-1.5	-0.2	+0.4	+1.2	+2.4	+4.0		
24.0 744	-18.0		-16.9	-12.5	-11.1	-9.6	-7.6	+4.7	-1.9	-0.5	+0.0	+0.8	+0.9	+4.0		
25.0 744	-16.0			-12.2	-10.8	-9.8	-8.0	+5.1	-2.4	-1.0	-0.2	+0.2	+1.9	+3.0		
26.0 744	-17.0		-16.9	-12.7	-11.6	-10.5	-8.6	+5.7	-2.9	-1.2	-0.5	+0.0	+0.9	+4.0		
27.0 744	-18.0			-13.5	-12.4	-11.4	-9.2	+6.1	-3.4	-1.4	-0.5	+0.0	+0.9	+2.0		
28.0 110	-19.7			-12.0	-11.7	-11.2	-9.4	+6.0	-4.2	-1.9	-0.6	0.0	0.0	3.5	3.6	
29.0 113	-20.3			-15.0	-15.2	-12.3	-9.4	+6.0	-7.5	-0.2	0.1	0.0	1.0	4.6	4.7	
30.0 113	-20.8			-12.0	-12.2	-11.3	-9.0	+5.7	-7.5	-0.5	0.1	0.0	1.0	5.0	5.2	
31.0 115	-25.4			-14.8	-13.4	-11.4	-8.2	+5.1	-1.0	0.5	0.0	0.0	1.0	4.6	4.7	
32.0 115	-15.9			-13.8	-13.2	-12.1	-9.0	+5.6	-0.7	1.4	4.0	4.0	12.0	12.2		
33.0 115	-15.1			-14.8	-13.7	-10.6	-8.0	+5.3	-1.7	1.3	3.0	3.0	8.1	8.3		
34.0 117	-16.1			-14.0	-14.2	-11.8	-9.3	+5.6	-1.1	3.2	5.4	10.4	17.1	17.3		
35.0 118	-19.5			-17.8	-15.3	-14.0	-11.4	+5.7	-1.0	1.0	3.3	5.4	4.2	8.4		
36.0 118	-27.3			-15.8	-14.7	-13.4	-10.6	+5.4	-1.0	2.6	4.4	5.4	4.4	8.9		
37.0 120	-20.8			-20.6	-18.3	-16.5	-11.9	+5.5	-1.0	3.3	4.0	4.0	9.0	9.2		
38.0 120	-17.0			-16.3	-14.6	-11.5	-9.2	+5.2	-2.0	2.0	3.0	6.4	10.5	10.5		
39.0 120	-20.8			-15.0	-15.1	-14.2	-10.8	+6.3	-1.3	1.7	4.6	5.4	9.0	8.2		
40.0 119	-22.2			-18.0	-17.6	-15.6	-13.0	+7.1	+2.1	1.0	3.1	3.0	5.7	5.4		
41.0 117	-21.2			-21.0	-19.3	-17.1	-13.1	+8.4	+2.0	0.4	1.7	2.8	7.5	7.5		
42.0 117	-21.3			-20.7	-17.7	-14.2	-9.3	+8.1	0.2	4.0	4.0	4.0	6.6	6.4		
43.0 117	-24.9			-21.8	-20.3	-18.1	-15.6	+8.2	-1.3	3.1	6.4	7.5	8.1	8.2		
44.0 115	-21.7			-22.8	-21.7	-19.7	-14.0	+7.5	-0.4	4.6	7.4	9.0	15.7	15.9		
45.0 114	-28.2			-21.0	-19.4	-17.6	-13.7	+6.4	-0.3	3.7	7.0	10.9	14.8	19.0		
46.0 113	-24.5			-18.7	-16.9	-13.8	-9.6	+5.6	1.4	5.4	10.9	10.9	14.6	14.5		
47.0 110	-28.2			-25.2	-23.5	-18.7	-10.9	+5.0	3.1	6.4	11.0	12.0	14.0	14.2		
48.0 110	-27.7			-26.0	-23.9	-18.7	-10.9	+5.0	3.6	7.0	10.5	11.0	13.0	13.2		
49.0 108	-37.7			-32.0	-29.5	-25.3	-12.3	+5.0	3.6	7.0	10.5	11.0	13.0	13.2		
50.0 105	-34.2			-27.0	-25.3	-23.0	-13.4	+4.9	4.4	9.0	14.4	16.4	17.0	17.1		
51.0 105	-43.6			-27.6	-25.4	-23.0	-13.4	+3.5	3.0	10.4	17.4	19.0	22.1	22.3		
52.0 98	-50.8			-25.0	-22.1	-13.5	-2.7	5.4	11.1	15.0	42.0	42.0	42.7	42.9		
53.0 96	-40.4			-30.8	-24.2	-13.4	-5.0	6.6	14.2	17.4	35.1	36.1	36.1	36.3		
54.0 91	-41.6			-25.0	-22.2	-15.0	-3.6	6.0	12.5	17.0	38.1	38.7	38.4			
55.0 93	-27.7			-26.4	-22.8	-13.9	-2.9	5.6	13.9	16.4	36.1	36.5	36.5			
56.0 75	-26.9			-26.4	-22.6	-12.4	-2.9	8.1	17.3	22.4	24.0	24.0	24.0	24.5		
57.0 61	-35.2			-38.6	-24.9	-11.7	-2.1	10.2	21.6	22.0	33.7	34.0	34.1			
58.0 48	-33.7			-21.9	-18.6	-8.4	-0.5	12.4	21.6	22.0	33.7	34.0	34.1			
59.0 37	-26.4				-16.1	-8.7	2.3	17.1	31.2	33.9	42.4	42.4	42.4			
60.0 27	-19.1				-15.8	-8.3	4.3	21.7	31.7	42.4	42.4	42.4	42.4			
61.0 27	-20.8				-20.6	-11.7	1.8	20.7	32.7	36.0	36.4	36.4	37.0	37.0		
62.0 19	-14.5				-9.5	-2.5	20.0	24.4	24.4	24.4	24.7	24.8	24.8			
63.0 16	-18.2				-11.5	0.0	10.5	31.2	31.7	31.0	31.0	32.1	32.1			
64.0 10	-14.9				-11.4	1.0	12.7	14.5	14.7	14.4	14.4	14.9	14.9			
65.0 8	-19.8				-17.7	-1.0	10.7	12.3	12.4	12.5	12.5	12.5	12.5			
66.0 7	-12.2				-5.9	-2.5	4.0	16.4	17.1	17.0	17.0	17.3	17.3			
67.0 6	-19.7				-7.0	-1.0	15.1	16.0	16.0	16.4	16.4	16.4	16.4			
68.0 5	-21.5				-7.5	-2.0	8.4	9.0	9.1	9.1	9.1	9.1	9.1			
69.0 4	-8.3				-6.0	-10.3	10.4	10.4	10.7	10.4	10.4	10.4	10.4			
70.0 4	-10.3					-6.0	21.4	22.0	22.1	22.1	22.1	22.2	22.2			

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE										SEPTEMBER									
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)												
				LATITUDE	LONGITUDE														
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956													
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967													
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967													
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																			
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	CUMULATIVE	PERCENTAGE	FREQUENCY	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)			
SFC	720	-17.0		-9.6	-7.9	-5.5	-2.9	-0.7	+0.7	+2.7	+4.1	+6.7	+9.6	+10.0					
1.0	720	-22.0		-16.8	-10.9	-8.8	-4.6	-0.6	+3.4	+7.9	+11.3	+16.8	+28.0	+29.0					
2.0	720	-21.0		-14.5	-9.7	-7.5	-4.2	-0.5	+3.7	+8.5	+11.4	+17.9	+27.0	+28.0					
3.0	720	-19.0		-12.9	-8.9	-6.6	-3.8	-0.3	+4.0	+8.8	+11.6	+17.4	+28.0	+29.0					
4.0	720	-18.0		-11.8	-8.9	-6.7	-3.6	-0.3	+4.7	+8.9	+12.4	+19.4	+29.0	+25.0					
5.0	720	-21.0		-13.8	-9.6	-7.3	-4.0	-0.4	+4.8	+10.4	+13.5	+19.6	+20.6	+21.0					
6.0	720	-21.0		-14.2	-10.5	-7.9	-4.6	-0.5	+5.0	+10.4	+13.9	+16.2	+20.0	+21.0					
7.0	720	-23.0		-17.7	-12.9	-9.0	-4.7	-0.3	+5.6	+11.7	+14.5	+17.2	+20.0	+21.0					
8.0	720	-29.0		-16.5	-14.4	-10.1	-5.3	-0.4	+6.3	+12.7	+16.3	+18.7	+24.0	+25.0					
9.0	720	-30.0		-16.9	-13.5	-10.8	-6.1	-0.3	+7.4	+15.5	+18.1	+20.7	+25.0	+26.0					
10.0	720	-32.0		-19.2	-16.3	-13.0	-7.9	-0.2	+8.1	+15.3	+20.1	+22.3	+29.0	+30.0					
11.0	720	-35.0		-23.7	-18.8	-14.8	-8.9	-0.2	+9.3	+17.1	+19.8	+23.9	+28.0	+29.0					
12.0	720	-32.0		-27.3	-23.1	-17.8	-10.2	-0.0	+10.2	+17.5	+19.9	+23.9	+28.0	+30.0					
13.0	720	-34.0		-27.5	-24.1	-20.5	-10.8	-0.2	+9.6	+17.3	+20.3	+23.4	+27.0	+28.0					
14.0	720	-37.0		-27.7	-23.6	-19.4	-11.6	-0.6	+8.1	+14.5	+16.9	+18.9	+24.0	+27.0					
15.0	720	-27.0		-20.9	-18.9	-16.3	-9.4	-1.0	+5.1	+9.8	+12.9	+14.8	+23.0	+24.0					
16.0	720	-18.0			-14.7	-12.0	-7.5	-1.3	+2.8	+6.3	+8.4	+10.8	+22.0	+23.0					
17.0	720	-17.0		-11.8	-10.4	-8.5	-5.6	-1.4	+1.5	+3.8	+5.3	+7.3	+12.0	+13.0					
18.0	720	-16.0		-9.6	-8.2	-7.3	-4.9	-1.7	+0.5	+2.9	+4.7	+5.7	+10.0	+11.0					
19.0	720	-12.0		-9.4	-7.9	-6.8	-4.9	-2.3	-0.1	+1.7	+3.0	+4.4	+10.0	+11.0					
20.0	720	-11.0		-8.8	-7.7	-6.7	-5.0	-2.6	-0.3	+1.0	+2.2	+3.5	+5.0	+6.0					
21.0	720	-12.0		-8.9	-7.8	-6.8	-5.4	-2.7	-0.4	+0.5	+2.0	+3.4	+7.0	+8.0					
22.0	720	-12.0		-9.1	-8.4	-7.4	-5.6	-3.0	-0.6	+0.2	+1.4	+2.6	+3.7	+4.0					
23.0	720	-17.0		-9.6	-8.6	-7.7	-5.8	-3.2	-0.8	-0.0	+0.6	+1.5	+5.0	+6.0					
24.0	720	-16.0		-10.2	-9.1	-8.0	-6.4	-3.7	-1.0	-0.0	+0.9	+2.1	+4.0	+5.0					
25.0	720	-15.0		-11.5	-9.9	-9.1	-6.8	-4.0	-1.1	+0.0	+0.9	+1.9	+4.0	+5.0					
26.0	720	-13.0		-11.4	-10.3	-9.0	-7.3	-4.3	-1.4	+0.2	+0.5	+1.6	+4.0	+5.0					
27.0	720	-17.0		-12.1	-10.8	-9.8	-7.4	-4.3	-1.3	-0.2	+0.4	+1.4	+5.0	+6.0					
28.0	104	-12.5		-12.5	-11.6	-9.7	-7.5	-4.2	0.2	2.4	4.4	7.0	11.9	12.1					
29.0	107	-17.4		-11.0	-10.0	-8.0	-7.5	-3.5	-0.2	1.4	2.0	3.0	11.2	11.4					
30.0	104	-10.1			-9.1	-8.0	-7.2	-3.4	0.4	3.4	5.0	6.0	11.6	11.7					
31.0	109	-10.7		-10.0	-9.1	-8.0	-6.9	-3.5	1.1	3.5	4.6	8.0	13.6	13.7					
32.0	104	-13.1		-12.0	-10.8	-8.0	-6.3	-1.6	1.4	4.5	10.6	11.0	15.6	15.8					
33.0	104	-12.2		-9.0	-8.9	-8.1	-6.0	-1.0	2.2	4.4	9.4	11.0	13.7	13.8					
34.0	109	-12.1		-11.0	-10.1	-8.4	-6.4	-1.4	1.8	5.2	6.4	7.0	11.4	11.5					
35.0	104	-11.9		-12.0	-11.5	-9.3	-7.0	-1.8	3.2	5.6	7.4	8.0	10.2	10.4					
36.0	104	-11.4			-10.7	-8.7	-6.8	-2.2	2.7	5.7	6.4	8.0	11.2	11.4					
37.0	107	-10.8		-12.0	-10.0	-8.6	-7.0	-2.1	3.1	6.4	7.4	9.0	16.4	16.5					
38.0	104	-14.3		-13.0	-11.0	-10.7	-6.0	-2.7	2.5	7.4	8.4	10.4	11.0	13.6	13.7				
39.0	106	-14.1		-13.0	-13.0	-12.8	-8.1	-2.4	2.1	8.4	10.4	11.0	13.6	13.7					
40.0	106	-15.9		-15.0	-14.4	-11.3	-9.0	-2.4	3.4	5.7	9.4	10.0	14.5	14.5					
41.0	102	-14.2		-17.0	-16.1	-14.6	-8.6	-2.2	4.0	8.0	11.7	13.0	14.2	14.4					
42.0	102	-10.4			-18.7	-15.9	-9.7	-1.5	3.0	9.2	9.0	14.0	14.6	14.7					
43.0	100	-19.9		-20.0	-17.0	-15.0	-11.4	-3.5	6.0	9.0	11.7	13.0	19.1	19.2					
44.0	99	-20.1			-16.9	-16.0	-11.1	-1.2	6.4	9.0	10.0	21.0	21.4	22.0					
45.0	94	-25.5			-17.8	-12.6	-7.4	-0.8	5.7	9.1	10.0	19.1	20.1	20.1					
46.0	94	-14.1			-16.0	-13.1	-7.4	0.4	6.4	13.2	15.0	24.1	24.9	24.9					
47.0	84	-15.6			-12.4	-8.8	-6.1	1.2	6.5	13.4	14.0	20.1	20.4	20.4					
48.0	84	-16.4			-9.5	-8.4	-6.0	0.7	7.0	11.9	17.1	19.2	19.4	20.1					
49.0	83	-14.5			-13.6	-8.4	-6.0	2.1	9.6	12.5	14.1	15.9	17.0	17.1					
50.0	81	-14.8			-12.6	-10.9	-4.2	3.5	11.5	14.7	15.4	21.2	22.1	22.2					
51.0	74	-15.6			-15.1	-9.2	-4.5	4.4	11.5	13.4	19.4	21.1	22.2	22.4					
52.0	64	-14.6			-9.6	-7.7	-2.5	4.5	11.7	15.7	19.5	20.2	20.6	20.6					
53.0	61	-12.2				-7.9	-0.6	5.6	13.2	17.0	14.4	19.5	20.1	20.2					
54.0	54	-13.9			-10.7	-7.1	0.1	6.4	13.1	22.1	23.7	27.4	28.1	28.4					
55.0	54	-15.5			-7.7	-6.7	-1.1	5.3	13.3	23.1	24.7	33.4	34.2	34.3					
56.0	46	-15.7			-7.0	-5.7	-0.9	5.3	17.1	18.7	21.0	34.4	34.8	34.8					
57.0	37	-4.6				-4.1	-0.7	6.1	13.0	19.2	21.1	21.5	21.7	21.7					
58.0	31	-4.5				-2.4	1.4	9.1	14.1	20.7	22.4	22.6	22.7	22.8					
59.0	20	-5.4				-5.0	-1.4	10.0	18.4	15.0	19.4	19.5	19.6	19.7					
60.0	12	-9.9					-7.1	5.0	16.1	22.4	22.4	23.0	23.1	23.1					
61.0	4	-19.1					-12.7	5.5	11.7	33.5	33.7	33.4	33.9	33.9					
62.0	6	-26.3						-12.0	11.0	11.5	11.4	11.7	11.7	11.7					
63.0	6	-32.2						-12.0	4.1	4.9	5.1	5.2	5.3	5.3					
64.0	2	-4.1						-8.0	5.5	5.7	5.7	5.4	5.4	5.4					
65.0	1	-24.8													-24.4				
66.0	1	-32.9													-32.9				
67.0	1	-24.5													-24.5				
68.0	1	-27.8													-27.8				
69.0	1	-10.7													-10.7				
70.0	1	-0.2													-0.2				

DATA SOURCE										OCTOBER						
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED	DIR (DEG)
5FC	744	-14.0		-12.9	-9.8	-7.7	-6.2	-4.3	-1.4	+0.2	+2.2	+3.2	+3.9	+6.9	+9.0	
1.0	744	-18.0		-16.9	-14.3	-12.5	-10.3	-6.7	-2.0	+2.5	+6.5	+8.6	+10.2	+15.9	+17.0	
2.0	744	-19.0		-15.9	-14.2	-10.8	-8.9	-4.8	-0.6	+3.7	+7.9	+9.7	+12.5	+16.9	+18.0	
3.0	744	-13.0			-11.6	-9.2	-7.7	-4.2	-0.2	+4.8	+8.9	+11.5	+13.8	+16.9	+19.0	
4.0	744	-14.0		-12.9	-11.3	-9.4	-7.4	-3.9	+0.0	+5.7	+10.5	+13.0	+15.5	+17.9	+20.0	
5.0	744	-19.0		-17.9	-12.7	-10.6	-8.0	-4.2	+0.3	+6.7	+11.9	+14.3	+16.7	+22.9	+24.0	
6.0	744	-22.0		-19.9	-13.8	-11.2	-8.6	-4.6	+1.1	+8.5	+13.4	+16.8	+19.8	+27.4	+28.0	
7.0	744	-23.0		-20.9	-15.7	-12.8	-9.8	-4.6	+1.7	+9.8	+15.8	+19.2	+22.5	+30.9	+35.0	
8.0	744	-24.0		-21.9	-18.6	-15.6	-10.5	-5.1	+2.7	+11.7	+17.9	+21.6	+26.5	+33.9	+37.0	
9.0	744	-28.0		-27.9	-21.5	-16.6	-12.1	-5.3	+3.1	+13.9	+20.6	+26.0	+33.5	+39.9	+47.0	
10.0	744	-27.0			-23.3	-21.3	-14.8	-6.5	+4.5	+16.6	+24.6	+30.3	+38.7	+45.4	+46.0	
11.0	744	-33.0		-32.9	-27.2	-23.0	-16.1	-8.3	+4.7	+18.6	+27.9	+35.0	+41.3	+46.9	+48.0	
12.0	744	-36.0		-34.9	-27.5	-24.2	-18.3	-9.0	+4.8	+19.7	+29.2	+36.6	+41.7	+45.9	+49.0	
13.0	744	-43.0		-38.9	-26.2	-21.7	-17.5	-8.3	+4.5	+17.3	+25.6	+32.6	+37.4	+42.9	+45.0	
14.0	744	-34.0		-31.9	-24.5	-20.0	-15.4	-7.2	+3.7	+14.3	+19.9	+26.0	+29.5	+33.4	+34.0	
15.0	744	-30.0		-28.9	-18.6	-15.4	-12.6	-5.3	+2.8	+11.2	+16.0	+18.6	+21.5	+28.4	+29.0	
16.0	744	-25.0		-21.9	-16.5	-12.6	-9.7	-4.2	+1.5	+8.1	+11.7	+14.3	+17.8	+24.9	+27.0	
17.0	744	-16.0		-14.9	-10.8	-8.7	-6.7	-3.6	+0.4	+5.4	+8.8	+11.2	+14.5	+24.9	+27.0	
18.0	744	-12.0		-10.9	-8.3	-6.9	-5.7	-3.4	+0.3	+2.9	+6.1	+8.6	+12.2	+19.9	+26.0	
19.0	744	-10.0		-9.9	-7.8	-6.8	-5.6	-3.6	+0.8	+1.8	+4.6	+6.3	+9.1	+14.9	+23.0	
20.0	744	-9.0			-7.9	-6.8	-5.6	-3.8	+0.9	+1.0	+3.6	+5.5	+8.9	+12.9	+16.0	
21.0	744	-11.0			-7.9	-7.0	-5.9	-4.0	+1.1	+0.7	+2.8	+3.8	+5.7	+10.4	+11.0	
22.0	744	-12.0			-8.7	-7.4	-6.0	-4.3	+1.4	+0.4	+2.3	+3.4	+5.1	+6.9	+9.0	
23.0	744	-11.0	-10.9		-8.8	-7.5	-6.4	-4.5	+1.4	+0.4	+2.3	+3.3	+4.6	+5.9	+9.0	
24.0	744	-10.0			-8.5	-7.3	-6.0	-4.3	+1.6	+0.6	+2.8	+3.9	+5.1	+7.9	+10.0	
25.0	744	-9.0			-8.1	-7.1	-6.2	-4.5	+1.5	+0.8	+2.9	+4.3	+5.5	+8.9	+11.0	
26.0	744	-11.0			-9.5	-8.0	-7.0	-4.8	+1.4	+1.3	+3.3	+4.2	+4.8	+6.9	+8.0	
27.0	744	-13.0	-11.9		-9.1	-8.0	-6.8	-4.8	+1.4	+1.3	+4.0	+5.5	+6.1	+6.9	+10.0	
28.0	74	-0.9			-9.2	-6.4	-5.8	-3.8	+0.5	5.3	7.4	8.9	12.3	13.9	13.4	
29.0	82	-0.2			-8.7	-7.0	-6.1	-4.1	+0.7	6.1	7.7	9.1	10.2	10.9	11.0	
30.0	84	-7.7			-7.1	-5.0	-4.2	-3.2	+1.0	4.5	9.4	12.4	14.1	14.5	14.4	
31.0	86	-0.8			-9.1	-6.7	-5.8	-4.3	+0.6	2.6	7.1	9.0	13.1	14.2	14.0	19.1
32.0	90	-12.7			-8.0	-4.7	-4.1	-3.6	+0.5	2.5	7.2	11.2	12.0	14.1	14.1	19.2
33.0	90	-12.3			-6.5	-4.6	-4.1	-3.1	+0.1	7.4	11.4	13.0	14.1	14.5	14.6	
34.0	90	-4.5			-8.0	-6.2	-5.7	-4.7	+1.0	7.7	11.2	12.0	13.1	13.9	14.1	
35.0	90	-13.5			-11.0	-8.5	-7.4	-6.4	+1.3	7.0	13.1	13.7	20.1	20.0	21.0	
36.0	91	-13.9			-11.0	-8.5	-7.4	-6.4	+1.3	7.3	9.0	11.0	12.1	12.8	13.0	
37.0	90	-14.0			-11.0	-8.5	-7.4	-6.4	+1.3	8.2	11.2	12.0	13.1	13.7	13.8	
38.0	89	-15.0			-10.0	-8.4	-7.5	-6.5	+1.6	9.0	12.6	14.0	15.1	16.0	16.1	
39.0	94	-7.3			-8.4	-5.6	-4.7	-3.7	+1.2	11.4	17.4	19.0	22.1	23.3	23.4	
40.0	95	-0.0			-8.4	-4.6	-4.1	-3.1	+0.1	4.1	12.5	19.1	20.0	27.2	27.4	
41.0	94	-13.4			-7.6	-6.3	-5.2	-4.2	+0.2	5.1	12.5	18.1	22.0	23.0	24.0	
42.0	97	-15.1			-8.0	-7.1	-6.1	-5.1	+0.1	4.5	10.6	20.2	23.0	25.6	26.1	
43.0	97	-15.9			-9.8	-4.6	-4.1	-3.1	+0.4	7.3	14.5	22.2	26.0	31.0	31.7	
44.0	94	-14.6			-7.0	-3.8	-3.8	-2.8	+0.5	8.5	16.7	26.2	28.0	33.0	33.5	
45.0	92	-13.4			-6.0	-3.7	-3.7	-2.7	+1.2	9.4	18.2	27.4	32.0	36.1	37.0	
46.0	93	-12.3			-6.0	-3.4	-3.4	-2.4	+1.4	11.4	21.6	24.4	31.0	36.1	36.8	
47.0	91	-4.2			-5.0	-4.5	-4.5	-3.5	+1.1	13.1	22.5	29.5	32.0	34.1	34.3	
48.0	89	-5.0			-8.0	-2.5	-2.7	-1.7	+1.1	20.0	30.5	32.0	42.1	42.5	42.5	
49.0	86	-0.5			-5.0	-2.0	-2.0	-1.0	+0.5	18.2	31.2	34.2	39.0	45.1	45.6	
50.0	84	-7.5			-4.1	-2.8	-2.8	-1.8	+0.5	15.3	26.0	36.1	41.1	47.1	47.6	
51.0	79	-3.9			-0.6	-0.5	-0.5	-0.5	+0.5	14.8	26.5	36.1	42.2	43.2	43.9	
52.0	75	-4.2			-3.3	-0.6	-0.6	-0.6	+0.5	14.8	24.1	39.1	45.1	48.1	49.1	
53.0	70	-4.5			-2.4	-1.4	-1.4	-1.4	+0.5	15.3	27.0	36.4	43.0	46.2	46.5	
54.0	63	-3.3			-0.4	-2.1	-2.1	-2.1	+0.5	14.8	28.0	35.0	44.0	46.0	46.3	
55.0	57	-2.0			-1.7	-0.1	-0.1	-0.1	+0.5	12.5	26.0	37.2	39.7	45.3	45.7	
56.0	48	-4.6			-4.5	-1.6	-1.6	-1.6	+0.5	13.1	28.7	33.5	36.0	40.6	40.9	
57.0	40	-11.3				-4.0	-4.0	-4.0	+0.5	12.0	21.3	31.1	41.1	41.4	41.6	
58.0	34	-14.5				-10.3	-10.3	-10.3	+0.5	13.2	15.0	21.3	31.1	42.1	42.0	
59.0	27	-15.6				-1.6	-1.6	-1.6	+0.5	11.5	21.7	32.4	45.1	45.4	45.4	
60.0	22	-13.8				-5.0	-5.0	-5.0	+0.5	11.0	22.5	36.4	44.1	44.6	44.6	
61.0	14	3.2								11.0	20.4	51.1	51.7	51.0	52.0	
62.0	4	3.7								15.0	22.2	22.5	22.4	22.4	22.5	
63.0	2	2.1								2.0	25.4	25.5	25.5	25.5	25.5	
64.0	1	7.2													7.2	
65.0	1	16.0													16.0	
66.0	1	10.9													10.9	
67.0	1	6.4													6.4	
68.0	1	1.9													1.9	
69.0	1	4.6													4.6	
70.0	1	12.7													12.7	

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE										NOVEMBER							
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)										
				LATITUDE	LONGITUDE												
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967											
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967											
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																	
ALT. (KM)	NUM ØBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	CUMULATIVE 15.900	PERCENTAGE 50.000	FREQUENCY 84.100	95.000	97.720	99.000	99.885	MAX SPEED	DIR (DEG)
SFC	720	-9.0			-7.8	-7.0		-6.1	-3.9	-1.0	+0.4	+2.2	+3.2	+3.8	+7.0	+8.0	
1.0	720	-20.0			-14.8	-12.2		-9.8	-5.9	-0.9	+3.5	+7.6	+10.8	+12.5	+22.0	+23.0	
2.0	720	-19.0			-14.2	-11.1		-8.5	-4.6	-0.4	+4.2	+9.1	+12.3	+15.8	+25.0	+26.0	
3.0	720	-18.0			-11.8	-8.8	-7.3	-4.7	-0.2	+5.5	+10.4	+13.4	+17.2	+25.5	+26.0		
4.0	720	-16.0			-13.3	-10.7	-8.0	-4.3	-0.1	+6.4	+11.6	+14.2	+19.9	+26.0	+27.0		
5.0	720	-16.0			-14.3	-11.5	-8.7	-4.5	+0.4	+7.8	+13.2	+18.5	+21.9	+32.0	+33.0		
6.0	720	-20.0			-14.8	-12.7	-9.8	-4.9	+0.8	+9.8	+15.8	+21.3	+25.4	+31.0	+32.0		
7.0	720	-21.0			-16.7	-15.2	-12.0	-5.4	+1.6	+11.4	+19.8	+23.7	+30.9	+38.0	+39.0		
8.0	720	-31.0			-19.7	-16.9	-13.0	-6.0	+2.0	+12.5	+22.5	+28.7	+36.2	+49.0	+50.0		
9.0	720	-35.0			-22.9	-20.4	-15.5	-7.0	+3.0	+15.2	+24.8	+32.6	+38.6	+58.0	+59.0		
10.0	720	-38.0			-28.3	-24.1	-18.0	-7.2	+4.1	+17.3	+29.0	+36.8	+44.4	+67.0	+68.0		
11.0	720	-41.0			-29.9	-26.4	-19.5	-8.5	+4.3	+19.2	+31.8	+42.2	+47.9	+74.0	+75.0		
12.0	720	-42.0			-29.9	-26.5	-20.5	-9.4	+4.1	+20.3	+33.0	+42.7	+54.4	+86.0	+87.0		
13.0	720	-37.0			-27.1	-23.6	-18.6	-7.9	+4.7	+19.2	+29.8	+37.8	+45.7	+84.0	+85.0		
14.0	720	-33.0			-23.7	-17.5	-14.2	-6.0	+3.7	+16.5	+24.5	+33.2	+38.4	+70.0	+71.0		
15.0	720	-30.0			-21.2	-15.8	-14.3	-4.7	+3.7	+13.8	+21.1	+25.3	+29.6	+60.0	+61.0		
16.0	720	-24.0			-15.7	-12.7	-9.3	-4.2	+2.4	+11.1	+16.7	+21.3	+24.7	+40.0	+41.0		
17.0	720	-20.0			-14.7	-11.1	-8.4	-3.3	+1.5	+8.2	+13.2	+16.5	+18.8	+43.0	+44.0		
18.0	720	-15.0			-11.9	-9.1	-6.5	-3.2	+0.4	+5.5	+10.1	+12.3	+14.9	+22.0	+23.0		
19.0	720	-11.0			-8.9	-7.2	-5.4	-2.8	-0.0	+4.3	+8.2	+10.5	+12.9	+16.5	+17.0		
20.0	720	-8.0			-7.1	-5.7	-4.7	-2.7	-0.2	+3.2	+6.3	+8.5	+10.4	+18.5	+19.0		
21.0	720	-9.0			-7.2	-5.7	-4.4	-2.5	-0.2	+3.1	+6.0	+7.9	+11.4	+17.0	+18.0		
22.0	720	-10.0			-6.9	-5.9	-4.8	-2.6	-0.1	+3.4	+6.5	+8.7	+10.9	+19.0	+20.0		
23.0	720	-11.0			-7.1	-6.3	-5.1	-2.4	+0.2	+4.0	+6.3	+8.1	+10.7	+15.0	+16.0		
24.0	720	-10.0			-7.8	-6.4	-4.8	-2.4	+0.7	+4.5	+7.2	+8.9	+10.6	+14.5	+15.0		
25.0	720	-14.0			-8.8	-7.6	-5.6	-2.3	+1.2	+5.2	+8.1	+9.8	+11.6	+17.0	+18.0		
26.0	720	-12.0			-9.2	-7.5	-5.7	-2.1	+1.5	+6.0	+9.0	+10.9	+11.9	+13.5	+14.0		
27.0	720	-13.0			-10.1	-8.2	-4.9	-1.5	+1.8	+6.8	+9.8	+11.2	+12.6	+15.5	+16.0		
28.0	84	-4.5			-8.0	-2.6	1.0	6.2	11.4	14.4	16.4	18.4	19.1	14.7	18.4		
29.0	90	-6.0			-4.7	-3.5	1.3	7.2	12.4	16.4	19.4	25.1	26.0	25.1			
30.0	90	-7.9			-4.0	-2.8	2.4	7.4	14.6	17.4	19.4	23.1	23.4	23.9			
31.0	91	-9.7			-5.0	-2.8	3.4	9.7	14.3	17.7	19.4	20.1	20.6	20.6			
32.0	91	-7.9			-5.0	-2.4	2.7	10.1	14.5	19.2	20.4	21.1	22.2	22.3			
33.0	92	-6.9			-5.0	-1.7	3.7	10.2	14.1	20.0	22.0	27.1	28.1	28.2			
34.0	92	-7.1			-5.5	-1.4	3.2	11.2	14.1	22.7	25.0	28.1	28.7	28.4			
35.0	92	-6.3			-5.0	-3.4	2.4	11.4	20.1	26.4	28.0	31.1	31.6	31.6			
36.0	90	-4.9			-8.0	-5.5	3.1	10.3	14.1	22.4	30.0	30.7	31.1	31.2			
37.0	91	-7.0			-7.0	-4.5	2.0	11.6	20.4	24.5	30.0	36.1	37.1	37.3			
38.0	95	-10.7			-6.0	-3.6	2.0	14.1	21.2	24.1	35.0	41.0	41.4	41.9			
39.0	94	-14.1			-7.0	-4.1	3.0	14.1	24.1	31.2	34.0	41.1	41.9	42.0			
40.0	93	-15.1			-5.0	-4.4	4.0	15.5	25.5	34.4	37.0	41.1	42.0	42.2			
41.0	93	-12.5			-8.0	-3.4	4.4	17.1	28.4	37.4	40.0	43.0	43.5	43.6			
42.0	93	-14.2			-6.0	-2.4	6.3	14.4	31.5	40.4	43.0	45.1	45.3	45.4			
43.0	92	-4.5			-4.0	-2.4	8.2	21.0	31.4	44.4	46.0	53.1	54.0	54.2			
44.0	84	-3.3			1.5	4.2	11.0	23.0	40.3	51.6	57.4	59.1	59.6	59.7			
45.0	87	-4.1			-1.0	7.4	14.1	26.5	42.6	60.7	65.4	67.1	67.6	67.7			
46.0	84	-4.5			-1.0	10.2	16.1	27.3	46.2	65.7	72.0	72.6	73.1	73.1			
47.0	83	-4.2			5.4	8.6	19.1	24.0	44.4	67.0	73.1	79.1	79.5	79.6			
48.0	82	-4.9			-0.1	12.1	14.4	31.0	50.5	62.0	64.1	70.1	71.2	71.4			
49.0	84	-5.8			3.0	12.1	20.1	35.2	51.1	62.4	64.1	77.2	78.0	78.2			
50.0	86	-3.7			4.0	9.2	19.3	34.0	51.1	62.4	64.1	77.2	78.0	78.2			
51.0	77	-1.7			4.4	8.9	18.2	39.5	45.4	60.4	64.1	77.2	78.0	78.2			
52.0	74	-2.9			4.7	8.9	18.4	39.5	44.4	59.2	63.4	72.1	72.5	72.5			
53.0	70	-4.7			2.4	6.3	16.1	31.1	40.3	54.5	62.0	70.4	71.1	71.2			
54.0	61	-4.5			0.4	5.0	13.4	30.4	50.7	64.0	67.4	76.4	77.1	77.2			
55.0	52	-5.5				-2.4	14.3	31.5	44.4	55.7	62.0	62.7	62.9	62.9			
56.0	47	-4.9			-3.0	1.4	12.6	31.5	47.5	52.7	54.0	59.5	59.9	59.9			
57.0	44	-1.3			1.0	5.1	14.7	32.4	44.7	49.4	54.0	63.1	63.5	63.5			
58.0	34	1.4				9.5	17.0	35.0	44.5	44.4	59.1	59.4	59.9	59.9			
59.0	29	-2.1				2.5	19.4	36.1	51.4	61.6	65.4	65.4	66.1	66.2			
60.0	21	-6.4				10.0	25.2	39.5	49.7	62.0	64.1	69.7	64.0	64.9			
61.0	14	0.1					13.5	24.0	50.5	71.1	71.1	71.4	71.4	71.5			
62.0	15	4.7					11.2	27.5	55.5	63.1	63.7	63.9	64.1	64.1			
63.0	11	1.4					4.7	15.5	41.1	59.4	59.7	59.9	60.0	60.0			
64.0	7	-1.0						-0.0	4.5	46.0	52.0	53.1	53.1	53.3			
65.0	6	4.8						25.0	56.1	55.7	55.0	56.0	56.0	56.0			
66.0	4	4.5						15.0	44.2	44.4	44.4	44.4	44.5	44.5			
67.0	4	-0.6						4.0	20.2	20.5	20.4	20.7	20.7	20.7			
68.0	4	-6.1						1.0	44.5	41.1	41.1	41.4	41.4	41.4			
69.0	3	-23.7						4.5	44.7	49.2	49.4	49.4	49.4	49.4			
70.0	2	-32.5						-32.0	60.0	70.2	70.2	70.3	70.3	70.3			

Positive is wind from the right (195°).
Negative is wind from the left (015°).

DATA SOURCE											DECEMBER					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280		5.000	15.900	50.000	84.100	95.000	97.720	99.000	99.865	MAX SPEED (DEG)
5FC	744	-9.0			-8.3	-7.1		-5.3	-3.2	-1.0	+0.8	+2.9	+4.2	+5.8	+7.4	+8.0
1.0	744	-19.0		-17.9	-13.2	-11.1		-8.5	-5.0	-0.3	+5.0	+9.2	+11.8	+13.5	+18.9	+24.0
2.0	744	-16.0		-16.9	-10.7	-8.7		-6.9	-3.6	+0.6	+6.1	+10.2	+13.5	+15.8	+20.9	+23.0
3.0	744	-27.0		-17.9	-11.6	-8.6	-6.3	-2.8	+1.3	+7.4	+12.1	+14.8	+18.4	+22.9	+26.0	
4.0	744	-27.0		-18.9	-13.5	-10.2	-6.7	-2.6	+2.5	+9.8	+14.4	+17.6	+22.5	+28.9	+32.0	
5.0	744	-23.0		-22.9	-15.2	-10.5	-7.2	-2.2	+3.8	+11.9	+17.2	+22.6	+27.5	+35.9	+41.0	
6.0	744	-30.0		-26.9	-16.2	-11.6	-7.3	-2.0	+4.5	+13.8	+19.6	+24.5	+29.7	+40.9	+49.0	
7.0	744	-29.0		-26.9	-16.2	-13.1	-7.7	-1.8	+5.8	+15.8	+21.9	+28.5	+36.5	+44.9	+60.0	
8.0	744	-33.0		-25.9	-18.1	-12.7	-7.9	-1.7	+6.9	+17.7	+27.2	+33.5	+38.5	+51.9	+67.0	
9.0	744	-33.0		-31.9	-19.7	-16.2	-10.6	-2.1	+7.9	+21.2	+31.3	+39.5	+45.1	+51.9	+60.0	
10.0	744	-32.0		-31.9	-21.5	-18.2	-12.5	-2.7	+9.0	+24.3	+34.8	+41.2	+48.2	+61.9	+71.0	
11.0	744	-31.0		-30.9	-22.7	-19.0	-14.4	-3.1	+9.3	+26.3	+37.9	+45.0	+50.5	+63.9	+71.0	
12.0	744	-41.0		-28.9	-23.1	-18.0	-13.2	-2.8	+10.3	+27.3	+40.2	+48.5	+54.7	+59.9	+62.0	
13.0	744	-33.0		-26.9	-20.7	-15.5	-10.9	-1.2	+10.4	+26.5	+39.2	+45.8	+52.2	+58.9	+63.0	
14.0	744	-28.0		-22.9	-15.7	-11.3	-6.7	-0.3	+9.8	+24.1	+33.7	+40.8	+43.2	+50.9	+52.0	
15.0	744	-26.0		-23.9	-11.2	-8.0	-4.8	-0.2	+9.1	+21.1	+27.4	+33.5	+38.5	+43.9	+45.0	
16.0	744	-19.0		-18.9	-11.7	-7.2	-4.8	-0.4	+8.0	+18.1	+23.9	+29.0	+31.7	+37.9	+40.0	
17.0	744	-22.0		-18.9	-12.2	-9.0	-5.6	-0.6	+6.4	+14.7	+20.7	+23.8	+27.2	+32.9	+40.0	
18.0	744	-13.0		-10.9	-8.3	-6.7	-4.9	-0.8	+3.9	+11.8	+16.4	+19.5	+23.1	+26.4	+27.0	
19.0	744	-12.0		-12.9	-7.7	-5.7	-4.2	-1.4	+2.4	+8.4	+13.2	+15.0	+17.8	+22.9	+24.0	
20.0	744	-15.0		-12.9	-7.7	-5.7	-4.2	-1.4	+2.4	+8.4	+13.2	+15.0	+17.8	+22.9	+24.0	
21.0	744	-15.0		-12.9	-7.2	-5.0	-3.9	-1.8	+1.1	+5.6	+9.6	+12.5	+14.3	+21.9	+24.0	
22.0	744	-13.0		-7.9	-6.0	-5.2	-4.0	-1.9	+0.8	+5.1	+8.2	+10.6	+12.8	+17.9	+19.0	
23.0	744	-12.0		-10.9	-6.3	-5.3	-4.4	-1.8	+1.3	+5.6	+8.4	+11.0	+12.8	+17.4	+18.0	
24.0	744	-9.0		-8.9	-6.8	-5.9	-4.2	-1.2	+2.1	+6.5	+9.5	+11.3	+12.2	+18.9	+20.0	
25.0	744	-18.0		-17.9	-8.5	-5.7	-4.3	-1.1	+2.6	+7.5	+11.1	+13.2	+14.5	+17.9	+19.0	
26.0	744	-13.0		-12.9	-8.1	-6.3	-4.1	-0.9	+3.1	+8.4	+11.9	+14.0	+15.9	+19.4	+20.0	
27.0	744	-15.0		-14.9	-9.2	-6.6	-4.4	-0.6	+3.7	+9.4	+13.0	+15.2	+18.0	+19.9	+23.0	
28.0	132	-0.4		-6.4	-5.0	-4.1	-3.0	0.3	7.0	12.3	15.0	17.4	19.7	22.2	22.5	
29.0	134	-0.2		-5.0	-3.4	-2.6	-0.2	0.2	7.1	11.0	17.3	18.0	19.7	24.5	24.6	
30.0	130	-10.1		-5.6	-1.0	-0.3	3.0	9.3	16.1	21.4	24.0	26.0	28.0	28.3	28.3	
31.0	140	-1.9		-1.4	-0.3	3.8	11.2	17.4	21.5	26.0	33.5	38.2	39.5	39.5	39.5	
32.0	141	-4.0		-2.0	-0.3	0.4	3.6	12.5	19.5	24.7	26.0	32.6	32.6	40.0	41.1	
33.0	141	-7.6		-4.4	-1.0	-1.0	2.4	14.3	21.2	27.0	29.0	31.0	36.4	41.7	41.9	
34.0	141	-6.3		-5.8	-4.4	-2.5	6.1	14.4	20.9	27.0	31.0	31.0	36.4	51.6	51.9	
35.0	141	-15.5		-9.6	-6.4	-3.5	4.1	14.1	21.4	29.0	32.4	32.4	34.6	36.7	36.4	
36.0	141	-11.5		-10.4	-8.4	-3.6	3.4	14.8	21.4	29.0	32.0	32.0	35.6	45.5	45.6	
37.0	141	-12.2		-10.6	-8.4	-4.6	3.4	14.3	24.2	29.3	33.0	33.0	34.4	50.1	54.4	
38.0	141	-10.0		-8.4	-6.3	-6.3	1.7	14.1	24.6	31.0	34.0	34.0	45.4	50.4	51.0	
39.0	142	-0.5		-8.4	-7.5	-7.5	2.6	14.4	27.5	33.9	34.0	34.0	41.4	50.1	50.3	
40.0	142	-14.5		-10.6	-9.4	-4.6	3.5	15.0	27.5	35.0	34.0	34.0	45.4	47.5	47.7	
41.0	142	-20.5		-11.8	-6.4	-3.9	2.8	16.2	26.0	33.0	37.0	37.0	40.4	41.7	41.9	
42.0	140	-23.6		-13.6	-8.4	-3.0	2.0	15.8	27.2	30.5	32.0	32.0	39.4	43.0	44.1	
43.0	139	-22.3		-13.6	-8.4	-0.7	4.8	17.2	27.2	31.7	34.0	34.0	39.4	40.1	40.2	
44.0	140	-21.0		-11.6	-7.8	-2.0	4.8	15.0	26.3	34.0	36.0	36.0	38.4	43.2	43.5	
45.0	138	-19.0		-10.6	-8.4	-1.4	4.4	15.0	26.4	32.5	35.0	35.0	36.6	45.6	45.7	
46.0	137	-15.4		-9.6	-7.0	-4.8	3.2	14.9	27.6	32.4	34.0	34.0	39.6	44.0	45.2	
47.0	136	-15.1		-12.6	-4.0	-3.0	4.0	14.7	30.2	36.4	40.0	42.4	43.3	43.4	43.4	
48.0	135	-23.1		-5.6	-6.5	-0.6	4.0	16.8	30.4	36.4	44.0	48.4	48.4	49.4	49.5	
49.0	130	-17.9		-10.8	-10.0	-1.8	4.6	18.0	27.8	39.5	48.4	48.4	48.4	49.4	49.9	
50.0	127	-24.7		-13.7	-12.1	-1.8	5.2	15.8	30.6	40.4	45.1	48.5	48.5	49.4	49.4	
51.0	122	-26.6		-17.8	-15.2	-3.0	3.4	17.3	30.4	40.4	48.5	48.5	50.4	51.0	51.1	
52.0	115	-26.7		-21.8	-12.4	-9.2	5.4	17.3	29.9	43.4	50.4	51.0	55.0	55.0	55.1	
53.0	110	-27.4		-22.0	-15.4	-8.4	4.9	16.7	28.1	41.5	52.4	54.4	55.1	55.1	55.2	
54.0	102	-18.8		-16.0	-13.7	-7.0	3.6	16.4	26.0	43.0	54.7	56.4	57.1	57.1	57.1	
55.0	92	-19.4		-16.5	-10.7	-1.8	1.8	15.2	29.7	47.4	53.0	61.1	61.7	61.4	61.4	
56.0	81	-22.3		-17.7	-12.9	-1.0	1.0	13.4	35.1	49.0	63.2	67.2	67.4	67.9	67.9	
57.0	67	-25.7		-16.5	-13.6	-2.7	12.6	36.4	47.7	55.4	61.5	62.4	62.4	62.4	62.4	
58.0	51	-17.5		-16.8	-15.4	-15.4	-4.6	11.5	31.5	53.5	54.4	57.4	57.4	57.7	57.4	
59.0	39	-21.5		-19.1	-19.1	-19.1	-7.8	6.8	25.0	57.1	64.1	64.1	64.1	64.1	64.1	
60.0	22	-32.7		-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	55.0	55.0	55.0	55.0	55.0	55.0	
61.0	15	-32.6														
62.0	4	0.3														
63.0	2	3.5														
64.0	1	13.6														

Positive is wind from the right (195°).
Negative is wind from the left (015°).

Positive is wind from the right (195°).
Negative is wind from the left (015°).

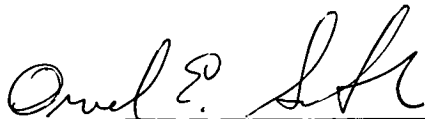
DATA SOURCE											ANNUAL					
TYPE OF DATA	ELEVATION RANGE	STATION	ELEVATION MSL (meters)	LOCATION		PERIOD OF DATA	EASTERN TEST RANGE (CAPE KENNEDY, FLORIDA)									
				LATITUDE	LONGITUDE											
SERIAL COMPLETED RAWINSONDE	0 to 27 km	PATRICK AFB, FLORIDA	7	28° 14' N	80° 36' W	JAN. 1, 1956 to NOV. 17, 1956										
SERIAL COMPLETED RAWINSONDE	0 to 27 km	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	NOV. 18, 1956 to DEC. 31, 1967										
ROCKETSONDE	28 km up	CAPE KENNEDY, FLORIDA	5	28° 29' N	80° 33' W	JAN. 1, 1960 to DEC. 31, 1967										
PREPARED BY : TERRESTRIAL ENVIRONMENT BRANCH, AEROSPACE ENVIRONMENT DIVISION, AERO-ASTRODYNAMICS LABORATORY GEORGE C. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALABAMA																
ALT. (KM)	NUM OBS	MIN SPEED	DIR (DEG)	0.135	1.000	2.280	5.000	15.900	PERCENTAGE FREQUENCY	50.000	84.100	95.000	97.720	99.000	99.865	MAX DIR SPEED (DEG)
5FC	8766	-17.0		-10.8	-8.0	-6.6	-5.1	-2.7	-0.5	+1.5	+3.4	+4.4	+5.9	+9.0	+12.0	
1.0	8766	-22.0		-18.1	-12.0	-9.8	-7.8	-4.0	+0.1	+4.9	+9.2	+11.9	+15.8	+22.2	+29.0	
2.0	8766	-25.0		-18.3	-11.3	-9.0	-6.7	-3.3	+0.2	+5.4	+10.0	+13.4	+16.6	+23.0	+28.0	
3.0	8766	-27.0		-17.8	-11.6	-8.6	-6.5	-3.2	+0.5	+6.2	+11.8	+15.2	+18.8	+26.0	+35.0	
4.0	8766	-29.0		-18.0	-11.9	-9.1	-6.7	-3.2	+0.8	+7.3	+13.5	+17.5	+21.4	+29.3	+41.0	
5.0	8766	-31.0		-19.3	-13.2	-9.8	-7.2	-3.3	+1.0	+8.5	+15.4	+19.7	+24.3	+33.8	+41.0	
6.0	8766	-33.0		-20.8	-13.7	-10.7	-7.8	-3.6	+1.2	+10.1	+17.5	+22.3	+27.3	+37.8	+52.0	
7.0	8766	-29.0		-23.5	-15.4	-12.3	-8.7	-4.0	+1.6	+11.7	+20.1	+25.5	+31.4	+43.1	+60.0	
8.0	8766	-33.0		-24.6	-17.2	-13.4	-9.8	-4.6	+1.9	+12.9	+22.6	+29.2	+34.8	+49.3	+67.0	
9.0	8766	-35.0		-28.3	-19.6	-15.3	-11.5	-5.4	+2.3	+15.0	+25.7	+32.4	+39.5	+53.5	+72.0	
10.0	8766	-40.0		-31.5	-22.6	-18.1	-13.6	-6.6	+2.8	+16.9	+28.6	+35.7	+41.9	+57.0	+71.0	
11.0	8766	-57.0		-33.5	-25.8	-20.0	-15.3	-7.9	+3.0	+18.5	+31.2	+39.0	+46.0	+62.5	+84.0	
12.0	8766	-50.0		-38.0	-27.2	-21.9	-16.7	-8.7	+3.2	+19.9	+32.3	+40.1	+46.6	+61.2	+87.0	
13.0	8766	-47.0		-36.7	-26.0	-21.7	-16.9	-9.0	+3.3	+19.0	+30.5	+36.9	+43.5	+58.0	+85.0	
14.0	8766	-43.0		-33.2	-24.0	-19.5	-15.3	-8.4	+2.6	+16.6	+26.5	+31.9	+37.6	+49.7	+71.0	
15.0	8766	-40.0		-27.3	-19.4	-16.2	-12.8	-7.0	+1.8	+14.4	+22.5	+26.8	+31.5	+40.3	+61.0	
16.0	8766	-30.0		-21.1	-15.9	-12.6	-10.3	-5.9	+0.9	+11.7	+19.2	+23.0	+27.0	+33.6	+48.0	
17.0	8766	-28.0		-18.2	-12.8	-10.6	-8.6	-5.1	+0.1	+9.0	+15.5	+19.4	+23.2	+30.7	+44.0	
18.0	8766	-20.0		-16.0	-10.8	-9.1	-7.5	-4.8	+0.3	+6.4	+12.2	+15.4	+18.9	+24.0	+32.0	
19.0	8766	-18.0		-13.4	-9.6	-8.3	-6.9	-4.5	+0.6	+4.1	+8.8	+12.0	+15.7	+22.0	+27.0	
20.0	8766	-19.0		-12.4	-9.3	-8.1	-6.9	-4.7	+1.0	+2.7	+6.7	+9.3	+12.0	+18.0	+25.0	
21.0	8766	-20.0		-13.7	-9.6	-8.3	-7.0	-4.8	+1.3	+2.0	+5.4	+7.8	+10.1	+15.6	+24.0	
22.0	8766	-31.0		-13.4	-10.0	-8.7	-7.4	-5.1	+1.5	+1.6	+4.9	+7.2	+9.5	+15.6	+25.0	
23.0	8766	-21.0		-15.4	-10.4	-9.1	-7.7	-5.3	+1.6	+1.7	+5.0	+7.2	+9.5	+16.1	+26.0	
24.0	8766	-20.0		-14.3	-10.6	-9.1	-7.8	-5.5	+1.7	+2.1	+5.6	+7.8	+9.9	+16.0	+24.0	
25.0	8766	-18.0		-14.2	-11.0	-9.8	-8.5	-5.8	+1.9	+2.5	+6.3	+8.4	+10.7	+15.7	+25.0	
26.0	8766	-20.0		-14.5	-11.5	-10.2	-8.7	-6.2	+1.8	+2.8	+7.1	+9.5	+12.0	+17.3	+28.0	
27.0	8766	-23.0		-16.2	-12.2	-10.7	-9.2	-6.4	+1.7	+3.2	+7.8	+10.7	+13.4	+21.0	+35.0	
28.0	1193	-15.5		-15.6	-11.0	-10.0	-8.3	-6.1	+0.3	+7.1	+11.5	+14.1	+16.5	+21.4	+25.0	
29.0	1224	-20.3		-17.3	-11.6	-10.4	-8.9	-6.0	+0.1	+7.4	+12.4	+15.4	+17.4	+24.3	+26.1	
30.0	1294	-20.8		-15.3	-11.6	-10.4	-8.4	-5.9	+0.7	+9.2	+14.4	+17.4	+20.3	+26.7	+28.3	
31.0	1262	-25.4		-14.8	-12.1	-10.6	-8.8	-5.6	+1.1	+10.7	+16.1	+19.1	+21.3	+33.3	+38.5	
32.0	1278	-16.7		-15.3	-12.7	-10.7	-9.1	-5.5	+1.4	+11.7	+17.4	+20.4	+24.3	+32.3	+41.1	
33.0	1294	-18.7		-15.3	-12.7	-10.7	-8.9	-5.7	+0.9	+11.6	+18.5	+21.0	+26.4	+40.2	+41.2	
34.0	1316	-20.5		-20.3	-13.5	-11.6	-9.6	-6.0	+0.7	+11.1	+19.4	+22.0	+26.4	+36.2	+51.4	
35.0	1330	-24.0		-20.7	-15.0	-13.4	-11.4	-6.0	+0.3	+11.0	+19.5	+23.4	+28.1	+34.2	+36.4	
36.0	1333	-27.3		-22.2	-14.0	-13.2	-11.2	-7.4	+0.2	+10.4	+19.1	+24.7	+27.2	+35.2	+45.6	
37.0	1334	-21.1		-22.2	-16.0	-14.9	-12.0	-7.5	+0.1	+11.0	+20.4	+25.0	+28.0	+36.2	+54.4	
38.0	1396	-21.0		-25.4	-16.4	-14.4	-12.3	-7.4	+0.0	+11.9	+22.0	+25.0	+30.4	+45.2	+51.0	
39.0	355	-25.1		-23.2	-17.1	-14.7	-12.6	-8.0	+0.3	+12.4	+24.3	+28.3	+32.4	+41.6	+50.3	
40.0	1357	-27.7		-23.6	-17.0	-15.7	-13.8	-8.7	+0.3	+13.2	+24.3	+30.0	+35.4	+45.2	+47.7	
41.0	1357	-32.7		-29.2	-20.3	-17.0	-15.0	-9.1	+0.7	+14.4	+25.0	+30.7	+36.4	+44.2	+48.1	
42.0	1344	-37.3		-27.2	-19.7	-17.4	-14.7	-9.6	+0.6	+16.0	+25.0	+31.4	+37.3	+45.2	+48.5	
43.0	1334	-25.9		-25.2	-20.2	-18.1	-15.8	-10.0	+1.5	+17.4	+27.7	+33.4	+40.2	+51.2	+54.2	
44.0	1322	-20.1		-26.2	-21.5	-19.2	-15.1	-9.0	+2.3	+17.4	+30.7	+37.4	+44.4	+57.6	+59.7	
45.0	1305	-24.2		-27.2	-21.2	-17.7	-14.0	-8.4	+3.4	+19.0	+31.0	+36.3	+46.0	+65.6	+67.7	
46.0	1287	-28.2		-27.3	-20.3	-17.4	-14.1	-7.6	+4.3	+21.7	+32.2	+39.2	+52.1	+72.4	+73.1	
47.0	1251	-29.4		-24.3	-21.2	-16.0	-13.7	-6.8	+5.0	+22.1	+35.0	+42.0	+55.4	+73.3	+79.6	
48.0	1234	-30.5		-28.3	-22.2	-18.0	-14.2	-6.6	+5.4	+22.0	+35.2	+45.7	+57.4	+70.3	+71.9	
49.0	1214	-37.7		-37.4	-25.0	-19.8	-13.8	-6.7	+5.7	+23.4	+37.1	+44.4	+55.4	+71.4	+78.2	
50.0	1174	-44.3		-36.4	-24.4	-18.4	-13.9	-6.4	+5.2	+24.6	+37.0	+47.7	+56.2	+66.3	+67.3	
51.0	1131	-40.0		-44.7	-24.2	-17.4	-14.3	-5.9	+6.0	+24.4	+36.1	+44.4	+51.7	+64.7	+70.4	
52.0	1071	-51.9		-51.6	-26.1	-19.0	-14.9	-6.1	+6.1	+23.7	+34.5	+47.4	+51.3	+63.6	+72.6	
53.0	1011	-54.9		-54.6	-27.3	-20.0	-15.1	-7.3	+6.3	+23.7	+37.7	+47.0	+52.4	+62.6	+71.2	
54.0	924	-56.7		-42.7	-26.4	-21.0	-16.0	-7.0	+6.5	+23.5	+39.5	+50.0	+54.4	+67.7	+77.2	
55.0	880	-51.8		-37.9	-27.3	-22.5	-17.0	-8.3	+6.4	+23.5	+40.0	+48.4	+54.3	+62.4	+62.9	
56.0	783	-44.8		-39.0	-28.0	-24.0	-17.5	-9.1	+6.9	+24.2	+39.4	+49.0	+54.5	+64.0	+67.9	
57.0	640	-56.0		-31.6	-28.1	-18.3	-9.3	-6.2	+6.2	+25.4	+41.0	+47.4	+53.7	+74.2	+75.4	
58.0	515	-49.1		-32.4	-28.1	-20.0	-10.9	-6.4	+6.4	+25.3	+41.1	+47.4	+54.4	+71.2	+71.7	
59.0	393	-52.1		-30.1	-26.1	-19.3	-10.1	-5.2	+6.2	+25.6	+42.1	+49.1	+57.1	+64.3	+68.6	
60.0	273	-54.7		-31.6	-28.4	-24.1	-12.7	-4.7	+6.7	+29.4	+42.8	+49.4	+54.3	+79.6	+80.0	
61.0	184	-34.4		-33.6	-27.4	-24.1	-15.4	-3.5	+3.6	+46.6	+51.4	+71.1	+79.1	+79.5		
62.0	124	-40.8		-35.4	-39.2	-24.4	-16.2	-4.7	+7.7	+45.8	+51.2	+53.4	+84.1	+84.3		
63.0	76	-50.3		-45.3	-45.3	-37.1	-11.0	-6.0	+7.0	+46.1	+59.3	+60.2	+60.4	+60.8		
64.0	49	-40.3		-38.0	-38.0	-32.6	-11.2	-4.5	+2.2	+47.5	+50.0	+52.7	+53.3	+53.4		
65.0	34	-34.0		-29.4	-29.4	-24.1	-11.0	-3.0	+2.0	+49.1	+55.1	+55.6	+56.0	+56.0		
66.0	29	-31.9		-33.4	-33.4	-31.4	-15.0	-0.5	+2.4	+42.6	+49.2	+48.4	+48.5	+48.5		
67.0	25	-46.7		-36.7	-36.7	-34.7	-20.4	-3.5	+1.0	+29.4	+36.4	+47.1	+47.4	+47.4		
68.0	29	-39.2	Positive is wind from the right (195°)	-22.2	-21.2	-21.2	-21.2	-4.2	+2.7	+47.5	+75.0	+75.4	+75.1	+75.2		
69.0	24	-21.7	Negative is wind from the left (015°)	-22.7	-17.2	-17.2	-17.2	-0.0	+2.0	+35.7	+48.4	+49.0	+49.3	+49.4		
70.0	24	-37.2		-32.7	-23.0	-23.0	-23.0	+2.5	+27.0	+40.4	+69.4	+70.0	+70.3	+70.3		

CAPE KENNEDY WIND COMPONENT STATISTICS
MONTHLY AND ANNUAL REFERENCE PERIODS FOR ALL
FLIGHT AZIMUTHS FROM 0 TO 70 KM ALTITUDE

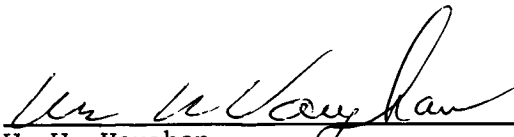
by S. C. Brown

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This document has also been reviewed and approved for technical accuracy.



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15. SUPPLEMENTARY NOTES The data in this report were prepared for application to space vehicle dispersion analysis and pitch (or yaw) program bias to minimize vehicle structural and control loads due to wind.					
16. ABSTRACT Head-, tail-, and cross-wind component speeds for Cape Kennedy are tabulated for all flight azimuths for altitudes from 0 to 70 km by monthly and annual reference periods. Wind speeds are given for 11 selected percentiles ranging from 0.135 percent to 99.865 percent for each reference period.					
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